The Effect of Modifying Maternal Expressed Emotion on Outcome of Preschool Hyperactivity

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Barton, J. The effect of modifying maternal Expressed Emotion on outcome of preschool hyperactivity. European Journal of Child and Adolescent Psychiatry. In preparation.

LIST OF ABBREVIATIONS

Statistical abbreviations

sd	standard deviation
df	degrees of freedom
n	number
p	probability that result occurred by chance
%	percentage
K_w	weighted kappa
τ	Kendall's tau b statistic

Outcome measures

PACS	Parental Account of Children's Symptoms
EE	Expressed Emotion
WI	Whole Interview
SPQ	Specific Probe Questions
BCL	Behaviour Checklist
PBCL	Preschool Behaviour Checklist
M-C	Mother-Child

SUMMARY

This study examined the effect of modifying maternal expressed emotion (EE) on outcome of hyperactive preschool children. Hyperactivity is amongst the most common childhood psychiatric disorders affecting at least one percent of the preschool population. The disorder is characterised by developmentally inappropriate levels of motor overactivity, inattention and impulsivity. Comorbidity with other disorders, especially Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) is common. Hyperactivity may be chronic with symptoms persisting into adulthood and can cause significant impairment in the day to day lives of affected individuals. Hyperactivity has its onset early in life and can be detected in the preschool period providing opportunities for early intervention.

Hyperactivity is currently conceptualised as a disorder of self-regulation. It is not a unitary disorder rather it is thought to be heterogeneous with multifactorial causation. There is evidence for a strong genetic (polygenic) contribution with the expression of the behavioural phenotype being influenced by environmental factors. The development of self-regulation is closely linked to the development of higher order cognitive functioning, a process which begins early in life. The caregiver plays a crucial role in the child's evolving self-regulation, facilitating or otherwise their mastery of the various steps involved in the development of this capacity. In particular the affective climate between mother and child has been shown to be related to the development of disruptive behaviour problems. Thus maternal expressed emotion (EE) may be an important mediator in the development and maintenance of hyperactivity. This in turn suggests possibilities for intervention and is this basis of the hypothesis for this study: that is, modifying maternal EE will exert a positive effect on outcome of preschool age hyperactive children.

An intervention programme, The Preschool Overactivity Programme (POP), was developed from existing evidence-based programmes with elements selected specifically to

achieve the key objectives of reducing maternal EE and promoting positive mother-child interaction. POP comprised a combined parent training programme and child behaviour management programme. A therapist's programme accompanied the treatment programme providing training for professionals from health, education and social services.

Subjects were recruited from children attending the Department of Child and Family Psychiatry at the Royal Hospital for Sick Children in Glasgow. Children between the ages of three and five years who presented with hyperactivity were included in the study. A range of assessment measures were used to examine aspects of the child's presentation and the affective climate between mother and child. These included a semi-structured interview (Parental Account of Children's Symptoms, PACS) completed with the mothers, self-completion rating scales about child behaviour completed by mothers and nursery staff where appropriate, together with ratings of maternal EE and the affective interaction between mother and child. A modified assessment protocol was used at follow-up at one, six and 12 months post-treatment. A waiting list control group was recruited for this study and they were assessed at baseline and again ten weeks later. This time period was chosen as it represents the duration of the intervention programme.

At total of 50 mother child pairs were recruited to the study together with 13 waiting list control pairs. Three mother child pairs dropped out of the Programme. This low drop out rate reflected the level of motivation amongst the mothers to get help for their children. The child group was also seen to be important in engaging the mothers and maintaining their attendance.

The sample ranged in age from 36 to 69 months (mean 47.37 months, SD 7.04) at baseline (Time 1). There was an uneven gender distribution with an overall ratio across subjects and controls of approximately of 6:1, males to females in keeping with existing literature which

describes a preponderance of males affected by hyperactivity. Subjects were more likely to be of lower socioeconomic status. Statistically significant reductions ($p < .0001$) in PACS ratings of hyperactivity and conduct problems were recorded post intervention and were maintained at follow-up. There were no significant changes in ratings of emotional disorder at Time 2 (one month post intervention) but a significant reduction (p .04) occurred between Time 2 and Time 3 (six months post intervention). In addition statistically significant reductions ($p < .0001$) were noted in ratings of maternal criticism together with statistically significant increases in maternal warmth ($p<.0001$). These effects were also maintained at follow-up. The only statistically significant changes observed in the outcome measures for controls between baseline and Time 5 (10 weeks later) were increases in conduct problems and maternal negative interaction. The study confirmed a significant association between maternal criticism and child disruptive behaviour, both hyperactivity and conduct problems. The study also demonstrated an association between intervention and reduction in maternal EE and reduction in child disruptive behaviour.

The study was limited in a number of ways. It was designed as an observational study in order that the relationship between EE and hyperactivity could be further explored and the effect of intervention assessed. Thus whilst the relationship between disruptive behaviour and EE can be described, a causative link cannot be assumed. Also, in view of the nature of the study design it was not possible to examine the relative contribution of the various components of the treatment programme. The controls were few in number and so comparisons with subjects were limited. The lack of robust information about the child's behavioural presentation from independent observers (e.g. nursery staff) could also be seen as a limitation. Whilst the study demonstrated maintenance of effect at 12 months follow-up the long-term effect cannot be addressed nor can the cost-effectiveness of intervention be assessed. The study was based on a clinic population and so the results cannot be applied to the general population.

This study provides further evidence for the role of EE in childhood hyperactivity. In particular it confirms that maternal EE is malleable and can be influenced favourably by intervention with a positive effect on outcome for children with disruptive behavioural problems.

CHAPTER 1 INTRODUCTION

1.1 Introduction

The term "hyperactivity" is popularly and professionally used to describe inattentive, restless and poorly controlled behaviour, which is common in young children where a continuum is observed. In many cases hyperactivity is strongly associated with other disruptive behaviours such as oppositionality, defiance and conduct problems. A relatively small number of children are severely affected with persistent and pervasive hyperactivity associated with other neurodevelopmental problems. According to current conceptualisation, hyperactivity is a paradigm for a biopsychosocial disorder where biological and environmental factors are involved in causation. There is an increasing body of evidence in support of the genetic basis of hyperactivity together with differences in brain structure and function in affected children (Tannock, 1998). Environmental factors associated with the development and maintenance of hyperactivity may include interpersonal interactions such as negative emotional relationships between the child and their primary caregiver and inappropriate child rearing practices. The latter, in turn, are frequently associated with, and often accentuated by, coexisting parental mental health problems and marital difficulties (Taylor, Sandberg, Thorley and Giles, 1991).

Hyperactivity is included in both of the internationally recognised systems of classification of diseases although they employ different terminology. In the International Classification of Diseases (ICD-10) (World Health Organisation, 1992) it is referred to as Hyperkinetic Disorder (HKD) whilst in the Diagnostic and Statistical Manual (DSM-IV) (American Psychiatric Association, 1994) the term Attention Deficit Hyperactivity Disorder (ADHD) is used. In this thesis the term hyperactivity will be used to encompass both diagnostic labels and the behavioural trait.

Hyperactive children experience significant difficulties in social relationships with other children (Hinshaw and Melnick, 1995). They are at times aggressive, intrusive, domineering and disruptive resulting in rejection by their peers. Parents and teachers are directive and controlling in their interactions with hyperactive children but become more positive and less controlling as the symptoms of hyperactivity lessen with age or treatment with psychostimulant medication (Barkley, Karlson, Pollard and Murphy, 1985). Possible explanations for social maladjustment in hyperactive children include specific deficits in social knowledge, attributional style and social reasoning, all of which may to a certain extent be influenced by primary caregivers.

There is increasing evidence that hyperactivity persists into adolescence and adulthood to some degree in as many as 50 to 80% of cases with children being at risk of on-going behavioural, academic, familial and social problems (Barkley, Fischer, Edelbrock and Smallish, 1990, Weiss and Hechtman, 1993). The cost of this to the individual and their family in terms of suffering and lost opportunities is enormous. The high rates of comorbidity with other behaviour disorders and the associated risk of juvenile delinquency and criminality mean that hyperactivity may also be costly for society as a whole.

Although hyperactivity has its onset in early childhood it is often not diagnosed until the school years and relatively little is known about the development of the disorder in early life; comparatively little research has focused on the preschool period. Hyperactivity is currently conceptualised as a disorder of the development of self-regulation (Barkley, 1997), a process which begins early in life. Kopp (1982) was amongst the first authors to discuss self-regulation from a developmental perspective, describing the relationship between the development of self-regulation and the growth of higher order cognitive processes. Such cognitive processes are described collectively as executive functions (EF's) in contemporary literature (Barkley, 2000; Pennington and Ozonoff, 1996). The

preschool period may therefore be of considerable importance in the development of hyperactivity and may offer opportunities for early intervention.

The immediate care-giving environment is vital to the child's development of self-regulation, influencing the emergence of appropriate self-control and self-regulatory capacities. Important functions of the caregiver in this respect include structuring the physical environment and directing social interaction (Kopp, 1989). Environmental stress and characteristics of the infant such as temperamental disposition may have an important role in disorganising the care-giving system and thus predisposing to the development of deviance. Highly directive, negative parent-child interactions, such as those seen in hyperactivity are associated with early manifestations of self-control problems and non-compliance (Sroufe, 1991).

The emotional climate in which an individual lives is known to exert an effect on outcome in psychiatric illness. High levels of expressed emotion (EE) (meaning the range of feelings and emotions encountered in day to day family life) have been shown to have a deleterious effect on outcome of patients suffering from schizophrenia and other psychiatric illnesses (Vaughn and Leff, 1976; Butzlaff and Hooley, 1998). More recently, the role of EE in child and adolescent psychopathology has been investigated (Asarnow, Tompson, Hamilton, Goldstein and Guthrie, 1994; Hirshfield, Biederman, Brody, Faraone, and Rosenbaum, 1997). This literature illustrates the applicability of the concept of EE to child and adolescent psychopathology but to date, there is little research relating specifically to hyperactivity disorders, especially in the preschool period. Taylor, Sandberg, Thorley and Giles (1991) in their study of the epidemiology of childhood hyperactivity described high rates of criticism expressed by the mothers and fathers of hyperactive children. Even though initiated at least in part by the child's behaviour, such

criticism may be a powerful determinant of outcome in view of the potential to disrupt caregiver-child interaction and the development of self-regulation.

In light of the above, this study was designed to evaluate the effect on outcome of preschool children presenting with hyperactivity, of a treatment programme specifically developed to modify maternal EE. In the following section an overview of hyperactivity disorders will be presented, including historical aspects, current conceptualisation, causation and developmental aspects together with a review of the role of EE in psychiatric illness. The theoretical basis of the study will be described.

1.2 Historical aspects

The current conceptualisation of hyperactivity represents a stage in a complex developmental pathway. A brief review of the history of hyperactivity is required in order to fully appreciate current thinking. More detailed reviews have been produced by Barkley (1997) and Sandberg and Barton (2002).

Still (1902) and Tredgold (1908) are frequently credited with the first descriptions of hyperactivity, however extensive accounts can be found in earlier psychiatric literature e.g. Crichton (1798), Hoffmann (1845), Ireland (1877), Maudsley (1867), Bourneville (1897), and Clouston (1899). It is noteworthy that the earliest descriptions were provided by Scottish and English physicians, in contrast to the popular perception of the disorder as an American phenomenon.

A unifying theme of early accounts of the causation of hyperactivity is that of some biologically driven abnormality of the brain. Thus Crichton (1798) described a "morbid alteration" of attention due to "an unnatural or morbid sensibility of the nerves" which was either congenital or acquired by accident (Palmer and Finger, 2001). Similarly, Clouston

(1899) believed hyperactivity represented an "explosive condition of the nerve cells in the higher cortex" whilst Still (1902) attributed the behaviour to a "morbid defect of moral control". Tredgold (1908) proposed that some forms of brain damage, such as those caused by mild anoxia and birth injury, although undetected at the time could present in later childhood as behavioural disturbance. He is widely acknowledged as the first author to provide an account of "Minimal Brain Damage", a term which was used for several decades to describe hyperactivity.

The epidemic of encephalitis which spread across Europe and the United States of America (USA) following the First World War provided further support for a link between brain damage and hyperactive behaviour. Clinicians were confronted by children who had survived the acute encephalitic process and subsequently presented with behavioural and cognitive problems. Many of the children were left with severe brain damage and in this respect only a few of those described would meet the criteria for hyperactivity as understood today (Hohman, 1922). Studies of children with epilepsy and those with lead poisoning, together with primate research in which animals subjected to frontal lobe lesions showed excessive restlessness and poor concentration, were cited in support of such an association.

The efficacy of psychostimulants in the treatment of hyperactivity represents one of the serendipitous discoveries which punctuate the course of medical history. Charles Bradley and colleagues used pneumoencephalography to examine the brains of children suffering from hyperactivity. Headache was a common side effect of this investigation which Bradley attributed to depletion of cerebrospinal fluid (CSF) and thought best treated by administration of Benzedrine to stimulate CSF production. This proved effective in relieving the headache and in addition, improvement was noted in the children's behaviour and school performance. This was thought to be due to stimulation of higher inhibitory

centres although Bradley considered that the euphoriant effect of the amphetamine was also important. He believed that the hyperactive behaviour resulted from the child's unhappiness and was their way of conveying this to others (Bradley, 1937; Bradley and Bowen, 1940).

As early as the 1930s Childers (1935) had discussed the fact that only a relatively small proportion of children with hyperactivity could actually be shown to have brain damage. Thus began the distinction between brain damaged and hyperactive children which continues to date. Pasamanick and Knobloch (1961) postulated a continuum of brain damage and a parallel continuum of medical, behavioural and environmental consequences.

During the 1950s and 60s the term Minimal Brain Damage continued to fall from favour. At the same time the assessment and diagnosis of children presenting with hyperactivity became more sophisticated, supported by the description of operationalised diagnostic criteria in ICD and DSM. Chess (1960) emphasised the importance of witnessing the hyperactive behaviour first hand rather than relying on the report of parents. In addition, rating scales such as the parent and teacher scales devised by Conners (1969), which although originally intended for monitoring response to drug treatment, represented an important development in the standardised assessment of children's behaviour.

The 1970's saw an explosion of research interest in hyperactivity with various aspects of the disorder being investigated. Perhaps the most significant development during this period stemmed from the work of Douglas (1972) and her colleagues. They proposed that the primary deficit in hyperactivity disorders was not the motor overactivity but the attention deficit. She demonstrated that hyperactive children experienced more problems with sustained attention particularly in situations where there were distractions. This work

was the impetus behind the revision of the diagnostic terminology in DSM-III (American Psychiatric Association, 1980) to Attention Deficit Disorder +/- Hyperactivity, shifting the emphasis from hyperactivity to attention deficit.

At the same time, the role of environmental factors in hyperactivity became popular, associated with a deepening of the controversy surrounding the medicalisation of child behaviour which persists to date. Of particular note because of the breadth and diversity of research which it spawned, is the work of Feingold (1975) who proposed that hyperactive behaviour resulted from an allergic reaction to food or food additives. To date research in this field remains inconclusive.

Similarly the role of parenting as an environmental factor in the causation of hyperactivity was postulated during this period. Thus Bettleheim (1973) proposed that the clinical expression of hyperactive behaviour resulted from negative handling by an intolerant mother of a temperamentally hyperactive child. There is an extensive literature describing the nature of parent-child interaction in hyperactivity which emphasises the negative, controlling aspects of the mother-child relationship (Barkley, Fischer, Edelbrock and Smallish, 1991). The direction of causality was originally attributed to the mother but further research, particularly of the effect of psychostimulants on mother-child interaction, emphasised the role of the child's behaviour in eliciting negative maternal responses (Barkley, Karlsson, Pollard and Murphy, 1985). Such negative parent-child interactions occur across the age range including the preschool period (Cohen, Sullivan, Minde, Novak, and Keens, 1983).

The search for empirical support for the disorder continued through the 1980's and 1990's. In particular attention focused on the neurobiological and psychological basis of hyperactivity disorders (Tannock, 1998) and the description of evidence based treatments

(Arnold et al 1997, Vitiello et al, 2001). The further development of more rigorous operationalised research diagnostic criteria and tools such as structured interviews have allowed clearer definition of the disorder. This in turn has facilitated research into the genetic basis such that it is now well established that there is a strong hereditary contribution to hyperactivity (Thapar, Holmes, Poulton and Harrington, 1999) and with this evidence, the search for candidate genes is in progress. In addition, advances in neuroimaging, especially the advent of magnetic resonance imaging (MRI), have allowed the detailed examination of both the structure and function of the brains of children with hyperactivity disorders, without the fears associated with radiation exposure (Eliez and Reiss, 2000). At the same time research has continued to examine the neuropsychological basis of hyperactivity disorders. In this respect significant progress has been made in understanding the function of the prefrontal cortex and in particular its role in self-regulation and EF (Barkley, 2000). Current theories focus on behavioural inhibition proposing this as the central deficit although there is a lack of consensus as to the nature of the impairment (Sonuga-Barke, 1995, Barkley, 1997).

The turn of the 21st century has seen the continuation of the controversy surrounding hyperactivity and its treatment, together with attempts to standardise practice by means of management protocols and clinical guidelines (Dulcan et al, 1997; Taylor et al, 1999; Barton et al, 2001). From the developmental perspective there continues to be a relative lack of attention given to the role of early intervention and prevention with a few notable exceptions (Sonuga-Barke, Daley, Thompson, Laver-Bradbury and Weeks, 2001).

The challenge for the next decade is to attempt to unify the various strands of research; biological, psychological and environmental, to provide a coherent theory for the basis of the disorder which in turn will inform the development of effective treatments.

1.3 Current conceptualisation

Hyperactivity is conceptualised as a neurodevelopmental disorder characterised by the constellation of three core symptom categories; overactivity, inattention and poor impulse control. The disorder typically arises early in life, often in the preschool period. The cardinal features of the disorder are all normal behaviours demonstrated by children, young people and adults in the course of day-to-day life. In order to meet criteria for diagnosis individuals must experience "impairment" as a result of their symptoms, however this distinction is subjective.

Hyperactivity is common and in many cases persists through adolescence and into adulthood (Biederman et al, 1996; Caspi, Moffitt, Newman and Silva, 1996). Significant numbers of affected children experience school failure and go on to develop Conduct Disorder (CD), delinquent behaviour and antisocial personality disorder (Barkley, Murphy and Kwasnik, 1996). The disorder is over represented in boys by approximately 4:1 (Gaub and Carlson, 1997).

It is recognised that hyperactivity is not a unitary disorder; rather a number of different pathways may lead to the presentation of the characteristic constellation of symptoms. A strong hereditary contribution to causation has been demonstrated with environmental factors influencing the expression of the disorder. It is likely that the disorder is polygenic with different combinations of genes and environmental factors resulting in the expression of the disorder in individuals.

1.4 Diagnostic criteria

The present revisions of ICD and DSM both include hyperactivity. ICD-10 (World Health Organisation, 1992) describes a severe and pervasive disorder (HKD) often accompanied by evidence of other neurodevelopmental delays. DSM-IV (American Psychiatric

Association, 1994) describes a spectrum of disorder (ADHD) of which HKD would represent the severe end. Another important difference between the two systems relates to the concept of subtype. ICD-10 does not distinguish subtypes whilst DSM-IV describes three; inattentive, hyperactive/impulsive and combined type. (HKD is similar to the combined type). Empirical evidence supports the existence of the two dimensions, hyperactive/impulsive and inattentive, implied in the DSM-IV system (Lahey, Carlson and Frick, 1997).

Hyperactivity is a clinical diagnosis based on observable behaviour. Both ICD-10 (World Health Organisation, 1992) and DSM-IV (American Psychiatric Association, 1994) require that a child achieve above a certain number of symptoms on prescribed symptom checklists and whilst symptoms are operationalised, criteria such as "often" are left to the clinician's judgement. Also both systems of classification require "impairment" and yet the impairment criterion is not operationalised. Existing evidence suggests that there are gender differences in the nature of hyperactivity (Gaub and Carlson, 1997) but no allowance is made for this in the diagnostic criteria. Information should be obtained from multiple sources and yet there is little direction as to how to deal with discrepant information. Diagnosis is made on the basis of clinical interview, but no advice is given as to whether it is the interviewer or the informant who makes the decision about whether or not a symptom is present.

Despite the fact that both systems of classification require onset before the age of six (ICD-10) or seven (DSM-IV) years, the criteria are not readily applicable to very young children and older adolescents and adults. Although parents frequently report onset early in life, the literature describing the diagnosis of disorders in the preschool age group is small in comparison to that for the school age population. Whilst some research has addressed the

applicability of existing criteria to this age range (Lahey et al, 1998, Pavuluri and Luk, 1998), further work is needed to operationalise core symptoms across the age range.

1.5 Validity of hyperactivity

Despite being the most researched of child psychiatric disorders the validity of hyperactivity as a syndrome remains controversial and in particular the drug treatment of affected children is branded as unnecessary "mind control" (Safer and Krager, 1992) by those who believe that hyperactivity constitutes normal childhood exuberance. The lack of an evolutionary perspective where hyperactivity may have been highly advantageous in previous times but is less so in the 21st century, is a further criticism levelled at contemporary researchers. Thus the face validity of hyperactivity is controversial with some believing this to be high (Goldman, Genel, Bezman and Slantez, 1998) whilst others object to hyperactivity being conceptualised as a psychiatric disorder (Safer and Krager, 1992).

Such issues may be particularly pertinent in the preschool age group where the distinction between developmentally appropriate exuberance and a child presenting with inappropriate levels of overactivity, inattention and impulsivity may be especially difficult. The situational variability of presentation may serve to further compound the diagnosis in young children where there is a natural reluctance to apply psychiatric diagnoses.

In view of this lack of consensus, other forms of validity are important. The various methods of assessment of hyperactivity have been shown to be reliable. Thus structured interviews (Shaffer et al, 1996), parent/teacher report questionnaires (Conners, 1973) and mechanical measures of activity (Teicher, Ito, Glod And Barber, 1996) have been shown to be reliable in distinguishing clinically referred from control children in terms of

overactivity and inattention. Here again there is less evidence in the preschool age group with the bulk of research focusing on school age children.

The concurrent validity of ADHD and the discriminant validity of its subtypes have been examined (Goldman, Genel, Bezman and Slantez, 1998). The combined type has a higher male: female ratio than the inattentive type. When demographic differences are controlled for, the combined type has most concurrent conduct problems and the inattentive type the least. The combined and hyperactive/impulsive subtypes are rated as more globally impaired and more likely to have accidents. The combined and inattentive subtypes show lower academic achievement.

The predictive validity of hyperactivity has been established by long-term outcome studies although these are limited by being based on pre-DSM-III-R criteria (American Psychiatric Association, 1987). Many of the supposed adverse outcomes cited in the literature (juvenile delinquency, antisocial personality disorder) may be due to comorbid disruptive behaviour disorders (including CD and Oppositional Defiant Disorder, ODD). However there is evidence that hyperactivity is associated with adverse outcome in academic achievement, occupational attainment and driving convictions (Barkley, Guevremont, Anastopoulos, DuPaul and Shelton, 1993; Taylor, Chadwick, Heptinstall and Danckaerts, 1996). Further methodologically rigorous outcome studies are required which follow children from the preschool period.

1.6 Prevalence

There are wide variations in the prevalence rates of hyperactivity disorders reported in the literature. It is most likely that these variations result from the different methodologies adopted by the various researchers, including different assessment measures and different diagnostic criteria. Some studies have adopted a categorical approach, based on

nosological constructs such as those in ICD and DSM, whilst others have adopted a continuous approach using validated rating scales to examine the distribution of hyperactivity/impulsivity and attention deficit traits in populations.

The Office for National Statistics survey (Meltzer, Gatward, Goodman and Ford, 2000) examined the prevalence of hyperactivity in the context of a population based study of psychiatric disorders in children and young people in the United Kingdom (UK). This study reported a prevalence of 1% in 5 to 15 year olds using ICD-10 criteria. Studies based on ICD criteria typically achieve lower rates than those employing DSM (Prendergast et al, 1988). Elia, Ambrosini and Rapoport (1999) reviewed prevalence studies and found a range from 1.7% to 17.8%. Two English studies have reported prevalence rates between 2% to 10% (Taylor, Sandberg, Thorley and Giles, 1991; McArdle, O'Brien and Kolvin, 1995) depending on whether ICD or DSM criteria were used.

Studies have shown that cultural differences amongst raters influence prevalence rates. Chinese and Indonesian clinicians gave higher ratings of hyperactive behaviour on scoring videotape footage than did their American and Japanese colleagues (Mann, Ikeda, Mueller, and Takahashi, 1992). Thus whilst different cultures may conceptualise hyperactivity in similar ways, cultural factors amongst raters may be important in determining thresholds for caseness and thereby reported prevalence.

The literature describing the prevalence of hyperactivity in the preschool age group is limited (Thomas, Byrne, Offord and Boyle, 1991). The paucity of research in this age group relates to the practical and theoretical difficulties encountered in making the diagnosis and the applicability and validity of the diagnostic criteria. Lavigne et al (1996) in their study of the prevalence of psychiatric diagnoses in a general population sample of preschoolers reported a prevalence of 2% using DSM-III-R criteria (American Psychiatric

Association, 1987). Studies examining the prevalence of hyperactivity in clinic referred preschool children are similarly few in number but report rates of 5% (Bhatia, Nigram, Bohra and Malik, 1991).

1.7 Comorbidity

Comorbidity is common, particularly with other disruptive behaviour disorders such as CD and ODD with studies frequently reporting rates of up to 50% (Jensen, Martin and Cantwell, 1997). Comorbidity with other disorders is also common, thus 25% of children have co-existent anxiety disorders and 20% have mood disorders. Comorbidity with specific developmental disorders is seen in 20% of cases (Jensen et al, 1997). The literature also describes an association between hyperactivity and tics and Tourette's syndrome in terms of the possibility of a common neurobiological basis (Comings et al, 1991) and the potential 'unmasking' of tics by psychostimulant treatment (Caine, Ludlow, Polinsky and Ebert, 1984).

Information regarding comorbidity in the preschool population is once again limited. In the study by Lavigne et al (1996) reported above, ADHD was almost always comorbid with another disorder, usually ODD (which was reported to affect 16.8% of their sample).

1.8 Treatment

Hyperactivity disorders cause significant morbidity for affected children, their families, schools, and communities. In addition they place considerable burdens on health care and education systems. Treatment of hyperactivity should, therefore, be seen as a priority. In this section the evidence for the efficacy of various interventions will be reviewed with particular reference to the preschool population.

1.8.1 Psychopharmacology

1.8.1.1. Psychostimulants

There is considerable evidence from short-term trials (up to three months duration) that the psychostimulants (Methylphenidate, Dextroamphetamine) are effective in treating the core symptoms of hyperactivity (Spencer et al, 1996; Santosh and Taylor, 2000). Fewer long-term placebo controlled studies have been completed, but those which have support the continuing effectiveness of psychostimulants whilst treatment continues (Wilens and Spencer, 2000).

Psychostimulants produce an improvement in the core behavioural and cognitive manifestations of hyperactivity in 70 to 80% of children (Spencer et al, 1996). In addition interaction with peers, teachers and family members improves (Barkley, 1989). Most of the research into the effectiveness of psychostimulants has addressed their use in the primary school age group. Less is known about their use in preschool children, adolescents and adults, although existing evidence suggests that they are useful across the age range (Musten, Firestone, Pisterman, Mercer and Bennett, 1997; Firestone, Musten, Pisterman, Mercer and Bennett, 1998).

Whilst they are undoubtedly effective, psychostimulants are not a "miracle cure". They do not entirely normalise social behaviour and it may take a long time before a child's reputation for disruptive behaviour disappears into the mists of time. Although the frequency of negative peer interactions decreases, the rate of positive interactions does not necessarily increase. Similarly, even though parents become less intrusive and controlling and more positive in their interactions with their children, they do not automatically adopt more appropriate parenting strategies.

Psychostimulants have unwanted side effects, the most common of which are insomnia, reduced appetite, abdominal pain, headache, dizziness, anxiety, irritability, and proneness to crying. Less common side effects include tics, cognitive impairment at higher dosage, loss of spontaneity, aloofness, involuntary movements, lip smacking, biting, fingertip picking, psychosis and bone marrow suppression (Wilens & Spencer, 2000).

Whilst there is a paucity of literature describing the use of psychostimulants in preschool children, existing evidence suggests that they are effective although their use requires close monitoring because of the high incidence of side effects (Firestone, Musten, Pisterman, Mercer and Bennett, 1998). The prescription of psychostimulants in this age group is relatively uncommon in the UK, they are however increasingly used to treat very young children in the USA. Rappley et al (1999) reported that in the Michigan Medicaid system Methylphenidate was the most frequently used psychotropic medication in three year olds whilst Zito et al (2000) reported a two to three fold increase in the prescription of Methylphenidate for two to four year old children between 1991 and 1995.

1.8.1.2 Tricyclic antidepressants

There is a body of evidence which supports the use of tricyclic antidepressants (TCAs) in the treatment of hyperactivity (Spencer et al, 1996). Here again there is little research examining their use in the preschool age group for whom they are rarely prescribed in the UK. They are widely accepted as a useful alternative for those children who cannot take psychostimulants, who do not respond adequately or those who experience intolerable side effects.

The usefulness of TCAs is limited by their side effect profile with 20% to 30% of children experiencing anticholinergic side effects. Cardiovascular side effects are also worrying, including increased pulse, blood pressure and cardiac conduction defects (Spencer et al,

1996). Indeed Desipramine has been linked with a number of sudden deaths in children (Wilens et al, 1996) although no clear causal relationship has been established.

1.8.1.3 Other drugs

The literature describing the use of a variety of other drugs (Specific Serotonin Re-uptake Inhibitors (SSRIs) Beta Blockers, Antihypertensives, Major Tranquilisers) is limited and much less robust, particularly in relation to treatment of preschool children. Such medications could not be considered to be first or even second-line treatment in most cases and indeed only the psychostimulants are licensed for use in the treatment of hyperactivity. The search for new drug treatments continues such as the new norepinephrine specific re-uptake inhibitor, Atomoxetine which has been shown to be effective in controlled clinical trials (Michelson et al, 2001).

1.8.1.4 Combined drug treatment

The use of combinations of drugs in the treatment of hyperactivity and comorbid disorders is discussed in the literature (Wilens, Spencer, Biederman, Wozhniak and Conor, 1995). In general combining drugs increases the risk of adverse events and interactions and should be avoided. It may however be necessary and appropriate to use combinations of drugs when symptoms remain problematic or comorbid disorders require treatment.

1.8.2 Psychosocial intervention

Whilst research supports psychostimulants as the most effective treatment of the core symptoms of hyperactivity there are circumstances in which other treatments must be considered. Up to 20% of children do not respond to psychostimulants, some children who do respond experience side effects to the extent that medication must be discontinued and some children and parents prefer not to use drugs. Although they are effective in the preschool period, side effects can be more severe and there is a general reluctance to

prescribe for this age group. In these circumstances psychosocial interventions may prove a useful alternative. There is also evidence that combining pharmacological and psychosocial treatments may be of benefit for some children (Vitiello et al, 2001).

The range and complexity of psychosocial interventions employed in the treatment of hyperactivity makes comparison of studies and firm conclusions about relative effectiveness difficult. The target of intervention varies as does the nature of the intervention (which might involve parent, child, teacher or a combination) and possible settings (home, classroom, playground etc). In general, interventions are effective at the time but problems with generalisation and maintenance of effect limit their usefulness.

1.8.2.1 Individual interventions

Interventions aimed at promoting positive behaviour and enhancing academic performance in school age children are effective in the short term (Barkley, Copeland and Sivage 1980). This is especially so when combined with interventions which introduce negative consequences for disruptive behaviour (Pfifner and Barkley, 1990). Much less evidence is available regarding the effectiveness of such interventions for the preschool age group. Similarly there is a paucity of information about classroom interventions for adolescents.

Cognitive behavioural strategies aimed at promoting self-control, self-regulation and impulsiveness have been studied in classroom and clinic settings. Early studies suggested that such interventions were effective but later studies have been less convincing. Whilst the combination of self-regulation training and behavioural interventions might produce short-term benefits, generalisation and maintenance of effect are limited (Abikoff, 1991). In view of the difficulties experienced by hyperactive children in peer interaction, social skills training is intuitively appealing. Studies suggest that such interventions are useful in the clinic setting but here again effects do not generalise to school and social settings

(Hinshaw and Melnick, 1995). Overall, social skills training may be more effective if it is integrated into curricular and extra-curricular activities in the school setting rather than being administered in the clinic setting. Social skills training strategies combined with strategies to reinforce non-aggressive behaviour are the most successful (Webster-Stratton, 1984). Again there is a paucity of literature examining the effectiveness of such interventions in the preschool period.

1.8.2.2 Parenting programmes

A range of intervention studies using a variety of strategies demonstrate that it is possible to alter parental behaviour and that this in turn is associated with changes in children's emotional and behavioural adjustment (Webster-Stratton, 1998). Very young children spend more time with their parents than anyone else. If behaviour management strategies are to be effective then who better to implement these with continuous opportunities for reinforcement? There are however potential drawbacks in using parents or caregivers as therapists. The behaviour of hyperactive children often elicits negative and controlling behaviour from their caregivers which may influence their ability to implement strategies effectively and consistently. Such difficulties however may be overcome by targeting intervention at parental negative affect in the first instance.

There is an extensive literature describing parent management training and its role in the treatment of disruptive behaviour disorders including hyperactivity (Kazdin, 1987). In general, the aim of parent management training is to promote more effective parenting by increasing the use of strategies to reinforce positive behaviour whilst reducing the use of controlling and negative strategies. The structure and content of parent management training programmes varies enormously and hence it is difficult to compare studies (which are often descriptions of individual programmes). In general however programmes draw on the work of Barkley (1981), Forehand and McMahon (1981) and Patterson (1974) with

variations in the curricula. Most programmes use weekly sessions, either group or individual, and teach parents a range of contingency management strategies such as response cost, time out and positive reinforcement. Some include aspects of psycho-education aimed at increasing parent's understanding of their child's behaviour and disorder.

An alternative to such contingency management strategies is the "mediational approach" to parenting proposed by Blakemore, Shindler and Conte (1993). This model emphasises the role of the parent in facilitating the child's development of self-control. Thus the role of the parent is much greater than the rigid application of contingencies. Instead parents are trained to help their child understand events and their outcomes (Koestner, 1984).

The range of techniques used in parenting programmes is extensive and includes, modelling of techniques, role-play, completion of assignments, in session practice, video modelling and homework to allow practice of new techniques. Some programmes advocate booster sessions at intervals following the completion of training to optimise effect (Anastopoulos and Barkley, 1989).

The rationale for using parent management training in the treatment of hyperactivity comes from a number of areas of existing evidence. Current conceptualisation of hyperactivity as a neurodevelopmental disorder of self-regulation suggests that it may be possible to intervene to facilitate the development of this capacity. In this respect training parents to promote their child's development would seem appropriate. Also the common comorbidity of other disruptive behaviour disorders (CD and ODD) with hyperactivity further supports the use of parent training in view of the empirical evidence for the effectiveness of such interventions in these disorders (Webster-Stratton, 1984). Finally, hyperactive children place enormous stress on parents who, in turn, become directive and negative in their

parenting style and report feeling ineffective and de-skilled. Many parents of hyperactive children are using effective strategies with other siblings and an important part of the therapeutic process involves pointing this out, whilst teaching them more effective ways of dealing with their hyperactive child (Barkley, 1997).

Evaluations of parent training programmes have demonstrated their effectiveness in improving child management skills, promoting parental confidence and reducing parental stress (Pisterman et al, 1992; Anastopoulus, Shelton, DuPaul and Guevremont, 1993). Studies examining the effect of parent training programmes on core hyperactivity deficits have produced mixed results with some studies suggesting improvement (Anastopoulus et al, 1993, Sonuga-Barke, Daly, Thompson, Laver-Bradbury and Weeks, 2001) whilst others do not (Pisterman et al, 1989, 1992, Vitiello et al 2001). Methodological factors, such as differences in subjects (including age range) and the content of parent training may explain these differences. In a review of psychosocial interventions Pelham, Wheeler and Chronis (1998) conclude that behavioural parent training meets criteria for empirically supported treatment for ADHD. There are no studies examining whether longer duration parent training programmes have more effect.

Of particular interest are the therapeutic processes which facilitate the effect of parent management training. Webster-Stratton and Herbert (1993) have examined this in relation to a parent-training programme for families of children with CD. Findings from the analysis of 100 hours of videotape of group discussions described a collaborative model underlying the therapeutic process. Six roles for therapists were identified: building a supportive relationship, empowering parents, teaching, interpreting, leading and challenging, and prophesising. In addition five recurring themes related to helping parents cope more effectively: promoting parents' problem-solving, helping parents "come to

terms" with their child, gaining empathy for their child, parents' accepting their own imperfection, and learning how to "refuel".

The role of parent training in the treatment of preschool children with hyperactivity disorders has again received comparatively little research attention. Intuitively it would seem advantageous to begin parent training as early as possible in the course of the disorder. Hyperactivity has its onset early in childhood and results from disordered development of self-regulation which may in part be influenced by the caregiver. Hence intervening early by teaching caregivers how to facilitate their child's development may prevent the maintenance or worsening of hyperactivity. Similarly early intervention may mediate against other factors known to be associated with hyperactivity such as parental stress, dysfunctional parent-child interaction and comorbid child psychopathology.

Recently Sonuga-Barke, Daley, Thompson, Laver-Bradbury and Weeks (2001) described the effectiveness of a health visitor led parent training intervention in reducing hyperactivity in preschool children. Other studies in this age group have been limited by the methodological problems referred to earlier and the results are mixed with some reporting interventions to be effective (Danforth, 1998) whilst others have failed to demonstrate sustained benefit (Barkley et al, 2000).

1.8.2.3 Family therapy

An association between marital conflict, family dysfunction, parental psychopathology and child behaviour problems, including hyperactivity and CD has been described. It would therefore not seem unreasonable to suppose that a family systems approach might be useful in addressing the problems of the hyperactive child. Research however has demonstrated that family therapy interventions are no more effective than parent training programmes (Barkley, Guevremont, Anostopoulos and Fletcher, 1992). Also, improvements resulting

from parent training programmes may be associated with secondary improvement in family functioning (Anastopoulos, Shelton, DuPaul and Guevremont, 1993).

1.8.3 Multimodal intervention

There is some evidence that combining behavioural interventions yields more powerful effects than interventions applied alone although the results are mixed and it is difficult to compare studies for the reasons described above. Horn, Ialongo, Greenberg, Packard and Smith-Winberry (1990) demonstrated that combining parent training and self-instructional training for school aged hyperactive children produced better results than either intervention alone. Abikoff and Gittleman (1984) found that a combined parent training and classroom intervention normalised levels of aggression in hyperactive children but had little effect on other measures.

Various studies have addressed the effects of combining behavioural and pharmacological interventions. There is some evidence that this combination may be more effective than either alone and that the addition of behavioural intervention to pharmacological intervention may allow the use of lower doses of medication (Vitiello et al, 2001). The effects of medication may also enable children to participate more effectively and make better use of behavioural interventions (Hinshaw, Whalen and Henker, 1984). It may be that behavioural and pharmacological interventions target different aspects of hyperactivity and this might account for any additive effect.

Methodological problems in previous studies have precluded cross study comparison of the relative effectiveness of different types of intervention. The National Institute of Mental Health's Multisite Multimodal Treatment of ADHD study (MTA) was designed to address some of the methodological requirements in order that conclusions could be drawn regarding the relative efficacy of behavioural, pharmacological and combined interventions

for school age children with ADHD (Arnold et al, 1997). This study was a randomised clinical trial of four treatment strategies: medication management, behavioural treatment, combined treatment and "active control" (usual clinic treatment). The results demonstrated the superiority of the medication algorithm over other forms of intervention and that combined intervention was superior to behavioural intervention alone (Swanson et al, 2001). Other findings included the usefulness of combined intervention in those cases where comorbid anxiety or CD were diagnosed and also that the combination of behavioural and medication management might allow the total dose of psychostimulant to be reduced (Vitiello et al, 2001). A similar study is currently underway addressing the same issues in preschool age children.

1.9 Outcome

The study of long-term outcome of hyperactivity disorders is subject to a number of limitations. The conceptualisation of hyperactivity and the diagnostic criteria for the disorder have changed over time and hence vary from study to study. The numbers involved in outcome studies have often been small and thus conclusions are limited. The lack of clarity about inclusion and exclusion criteria in many studies means that it is often not possible to distinguish the effect of hyperactivity disorders on outcome from the effect of comorbid disorders such as CD and other neurodevelopmental disorders. There are very few population based studies and therefore information about the natural history of the disorder is limited. There is a paucity of prospective longitudinal studies and those which have been done have not followed up subjects for adequate periods of time.

Bearing in mind these limitations, studies have described on-going attention deficits in significant numbers of affected individuals (up to 80%) throughout the teenage years and into early adulthood (Mannuzza, Klein, Bongura, Malloy and LaPadula, 1998; Lynam, 1996). This goes against previous conceptualisation of the nature of hyperactivity as

representing a developmental lag which with time, is caught up. Academic failure followed by a disrupted employment history seems to be a fairly common finding across the range of studies irrespective of method. Also hyperactive children are accident-prone which in late adolescence and young adulthood includes an increased risk of road traffic accidents (Barkley, Guevremont, DuPaul and Shelton 1993). Markers for poor prognosis are limited, thus it might be thought that the onset of hyperactivity of a pervasive nature early in life heralds a poor outcome, but this is not borne out by research (Weiss and Hechtman, 1993; Taylor, Chadwick, Heptinstall and Danckaerts, 1996).

The common comorbidity with CD has implications for outcome with 25% to 30% presenting with comorbid conduct problems and antisocial behaviour as teenagers (Manuzza, Klein, Bongura, Malloy and LaPadula, 1998). The association between arrest history and hyperactivity seems to be mediated by associated CD. Similarly the higher incidence of drug use in adolescents who were previously diagnosed as having hyperactivity is strongly related to comorbidity with CD. Studies have shown that treating hyperactivity symptoms reduces the risk of later substance abuse (Loney, Kramer and Salisbury, 1998).

1.10 Causation

Technological advances, together with increased sophistication in definition of the behavioural phenotype of hyperactivity have encouraged the investigation of factors involved in its pathogenesis. In particular, interest has focused on neurobiological and neurocognitive models and these will be summarised briefly here. There is however a lack of integration of the various strands of research and a failure to ground the findings in a developmental framework. As a result the complexity of the interaction of biological and environmental factors in the causation of hyperactivity remains to be fully described.

1.10.1. Neurobiological correlates

The continuing debate and controversy surrounding the validity of hyperactivity as a disorder have resulted in vigorous efforts to determine a biological basis and thus establish its legitimacy. The last twenty years have seen numerous studies addressing the genetic, neuroanatomical, neurochemical and neurophysiological basis of hyperactivity. Whist considerable progress has been made especially in describing the genetic contribution, to hyperactivity many questions remain to be answered about the significance of the neurobiological findings.

1.10.1.1 Genetic factors

Hyperactivity runs in families with increased incidence of the disorder in first-degree relatives of male probands (Faraone et al, 1992). The heritability of hyperactivity has been confirmed by twin and adoption studies with increased concordance in monozygotic compared to dizygotic twins (Thapar, Holmes, Poulton and Harrington 1999). With more accurate and detailed descriptions of the behavioural phenotype of hyperactivity together with the phenomenal advances in molecular genetic techniques it has been possible to begin the search for candidate genes. It is likely that the genetic contribution to hyperactivity is heterogeneous and that in any one individual, the combination of a number of genes predisposes to hyperactivity with the behavioural phenotype only being expressed under the influence of certain psychosocial conditions (Comings et al, 2000).

1.10.1.2 Neuroanatomical factors

There is a developing literature describing the examination of brain structure and function (Tannock, 1998) in children with hyperactivity. Methodological limitations (variation in scanning parameters, lack of specificity of inclusion and exclusion criteria) limit comparison between studies. In general findings have centred on the frontal cortex, in keeping with current knowledge of the role of this part of the brain in regulating self-

control. Practical and ethical factors limit the neuroradiological investigation of very young children, who are perhaps the most interesting group in terms of charting the development of differences and determining the extent to which such differences reflect a causative process or the effects of the disorder on the developing brain.

1.10.1.3 Neurochemical factors

To date studies addressing the neurochemical basis of hyperactivity in clinical samples have been uninformative and inconclusive. The effectiveness of psychostimulants in treatment implicates various neurotransmitter systems in causation. However studies examining neurotransmitters and their metabolites in CSF, urine and plasma have been inconclusive (Zametkin and Rapoport, 1987).

1.10.1.4 Neurophysiological factors

A range of electrophysiological studies have been reported in the literature including EEG, quantitative electroencephalography (*q*EEG) and Event-Related Potential (ERP) studies. Despite methodological limitations, the results of ERP studies are most consistent demonstrating abnormalities in the P300 wave which are thought to be a reflection of subcortical activation (for a review see Tannock, 1998).

1.10.1.5 Neurocognitive correlates

The research examining the neurobiological correlates of hyperactivity primarily centres on the frontal cortex of the brain. This area plays a central role in regulating the cognitive skills known collectively as executive function (EF). Various definitions of EF abound in the literature. Overall however EF incorporates a number of higher order cognitive functions including volition, inhibition, resistance to distraction, problem solving, flexible shifting of actions to meet task demands, maintenance of persistence toward attaining a

goal and self-awareness across time (Barkley, 2000). EF deficits have been demonstrated in hyperactivity although such deficits are not unique to this disorder and are also seen for example in autism (Pennington and Ozonoff, 1996). Nevertheless there is an increasing body of evidence supporting the theory that hyperactivity represents a disorder of self-regulation although there is a lack of consensus as to the nature of the underlying neurocognitive deficit (Sonuga-Barke, 1995, Barkley, 1997). Sonuga-Barke has proposed that hyperactivity may be psychologically heterogeneous and has described a dual pathway model of behaviour and cognition that identifies two subtypes of disorder. One results from poor inhibitory control whilst the other represents a motivational style characterised by delay aversion (Sonuga-Barke, 2002). In this respect an understanding of the development of self-regulation and factors which influence this are important and will be described later in this section.

1.10.2 Psychosocial correlates

Socio-economic deprivation, intrafamilial adversity and dysfunctional parent-child relationships are recognised as risk factors for disruptive behaviour disorders in general. The precise contribution of such factors specifically to the causation of hyperactivity disorders remains unclear in view of the frequent failure of studies to distinguish between children with hyperactivity alone and children with comorbid CD and ODD. Also the distinction between factors involved in causation and those involved in the maintenance of the disorder requires further investigation.

1.10.2.1 Socio-economic status

Studies examining the relationship between socio-economic status (SES) and hyperactivity are conflicting with some showing a relationship between social disadvantage and hyperactivity (Schachar and Wachsmuth, 1991) whilst others have not (Taylor, Sandberg, Thorley and Giles, 1991). The evidence is more convincing for a relationship between low

SES and poor attention (Taylor et al, 1991) which may reflect a failure of the low SES parent to educate their child or provide the necessary model to allow the child to develop attentional skills. Such factors may act in a causative way but may also serve to maintain disordered behaviour.

1.10.2.2 Family factors

The family constitutes the child's immediate environment and therefore intrafamilial factors may be important in the development of hyperactivity. Factors such as family stability, parental conflict and parental mental illness may all adversely affect the home environment and the well being of children growing up within it.

Existing evidence suggests that hyperactive children, especially the more severely affected, are more likely to experience family instability in the form of family break up, move of house and school than normal controls (Gillberg and Rasmussen, 1982; Hartsough and Lambert, 1982). Some studies have suggested that marital discord is associated with hyperactivity (McGee, Williams and Silva, 1984) but Taylor, Sandberg, Thorley and Giles, (1991) found that when hyperactivity and CD were carefully distinguished, hyperactive children (who met criteria for Hyperkinetic Disorder) were significantly less likely to come from homes characterised by marital discord.

1.10.2.3 Parental mental illness

Parental mental illness has been identified as a risk factor for childhood psychiatric disorder generally and maternal depression has been identified as a possible causative factor in childhood hyperactivity (Barkley, Guevremont, Anastopoulos and Fletcher, 1992; Taylor, Sandberg, Thorley and Giles, 1991). The mechanism of action may be via mother-

child interaction and the effect of this on child cognitive development, particularly the development of attentional skills and self-regulation.

Maternal depression, marital discord, paternal antisocial behaviour and marital aggression are interrelated. Maternal depression and marital discord are highly correlated and this combination of factors results in higher rates of perceived child behavioural problems, parent-child conflict and child aggression. Hyperactive children with this constellation of adverse psychosocial factors are particularly at risk of developing CD.

1.10.2.4 Parent-child interaction

There is an extensive literature describing the nature of parent (especially mother) - child interaction in hyperactivity disorders. The most consistent finding is of a preponderance of negative and controlling interactions on the part of the mother and withdrawal and lack of persistence on the part of the child (Danforth, Barkley and Stokes, 1991). These interactions are at their most striking in structured task situations where mothers are less likely to respond positively if their child behaves appropriately. Thus the mothers of hyperactive children are more critical of their children and show less warmth (Taylor, Sandberg, Thorley and Giles, 1991). Also mothers of hyperactive children seem less robust in their ability to cope with their children's challenging behaviour and emotional upset.

A number of authors have examined the nature of mother-child interaction during the preschool period and here again it is found that mothers tend to be more negative and controlling in their interactions and less flexible and responsive in their approach to their hyperactive child (Campbell, 1985). Mash and Johnston (1982, 1990) have suggested that these negative interactions may also be most stressful to the parent during this period.

There is some evidence to suggest that it is the child's behaviour that causes the mother to behave in a negative and controlling manner. When the child's hyperactivity is treated (with psychostimulants) an improvement is seen in the quality of mother-child interaction (Barkley, Karlsson, Pollard and Murphy, 1985). Other studies have suggested that negative mother-child interaction is not entirely due to the behaviour of the child in that a child's behaviour may be improved by teaching the mother more appropriate management strategies (Strayhorn and Weidman, 1989).

The association between maternal depression and childhood hyperactivity may be mediated through the effect on mother-child interaction. Depressed mothers are more disapproving and less positive in their interactions with their children (Cox, Puckering, Pound and Mills, 1987; Webster-Stratton and Hammond, 1988), less consistent in their response to their child and are less likely to be able to play interactively. The characteristics of the child are important in determining the effect of maternal depression. Thus certain child characteristics predict poor "linking" with mother, including emotional and behavioural problems and language difficulties (Cox et al, 1987). Clearly this is highly relevant to hyperactive children who present with difficult behaviour and are often immature in their language development.

Other characteristics of parenting style in hyperactivity have been examined where it has been established that parents of hyperactive children have lower expectations of their children (especially in terms of academic achievements) and offer fewer opportunities and encouragement (Gillberg and Rasmussen, 1982). Parents of hyperactive children use more discipline and may be more likely to employ physical methods of discipline than parents of other behaviourally disturbed children (Hartsough and Lambert, 1982).

It is recognised that the quality and nature of feelings expressed about relatives in day to day family life is important in the outcome of adult psychiatric illness (Bebbington and Kuipers, 1994). The construct of Expressed Emotion (EE) was developed in the 1950's to describe these important intrafamilial relationships (Brown, Birely and Wing, 1972). The relationships and patterns of interaction between caregiver and child also seem to be important in the development of child psychopathology in general (Hibbs et al 1991). In fact because of the individual nature of these interactions, EE may be more important in the development of child psychopathology than shared factors such as socio-economic deprivation and marital conflict (Plomin, 1994). Whilst the importance of EE in relation to adult psychopathology is well recognised less attention has been paid to its role in child pathology.

The available research examining EE in hyperactivity characterises the relationships between hyperactive children and their parents as lacking in warmth and high in criticism (Taylor, Sandberg, Thorley and Giles, 1991). Again this literature focuses on older hyperactive children although there is evidence to confirm this relationship in the preschool period (Baker, Heller and Henker, 2000). The role of EE in hyperactivity will be further explored later in this section.

The importance of the psychosocial factors described above in terms of causation and maintenance of hyperactivity requires further investigation. At present studies can only describe the association between various psychosocial characteristics and hyperactivity and no direction of causality can be assumed. Further research is required to address the relative contribution of the various child and environmental factors in the development of hyperactivity.

1.10.3 Other factors

A range of other potential causative factors have been proposed including perinatal adversity in term babies, prematurity, post maturity, prenatal drug and alcohol exposure, sleep disturbance, body lead levels, diet and Generalised Resistance to Thyroid Hormone. Many of the studies investigating these factors are limited methodologically and therefore firm conclusions cannot be made. Perhaps most evidence is available for the role of preterm low birth weight (less than 1000g) where it has been shown that there is an increased risk of hyperactivity, especially if the child is noted to have white matter lesions and enlarged ventricles on ultrasound examination (Szatmari, Saigal, Rosenbaum, Campbell and King, 1990).

The role of diet has been investigated since the work of Feingold in the 1970's raised the possibility that hyperactivity was caused by food allergy (Feingold, 1975). His work led to research into the role of various foodstuffs, artificial colourings and preservatives. More recently research has addressed the role of dietary deficiencies of various types, especially deficiencies of minerals and free fatty acids in the causation of hyperactivity (Richardson and Ross, 2000).

As intimated throughout this section, despite the fact that hyperactivity is characterised as a neurodevelopmental disorder which typically has onset early in life it has not been widely studied in the very young. The early origins of hyperactivity and the developmental precursors of the disorder are important and may provide opportunities for prevention and early intervention for vulnerable children and their families. The following section presents an overview of the issues surrounding hyperactivity in the preschool period.

1.11 Hyperactivity in the preschool period

A number of factors may account for the relative paucity of literature in this age group. There is a natural reluctance amongst families and professionals to label young children as disordered. Thus, families may be less inclined to seek help for a preschool child whilst professionals may be resistant to the idea of using psychiatric diagnoses in this age group. The core features of hyperactivity are exaggerations of normal childhood behaviour and it may be particularly difficult in young children to make the distinction between normal and abnormal behaviour. Therefore the differentiation between inattention and developmentally appropriate shifts in attention and normal lively behaviour and pathological overactivity in a preschool child are complex.

Parents often report that they were aware that their hyperactive child was 'different' from the age of 18 months or younger and that the professionals whom they approached about their concerns invariably dismissed such differences as "a phase he's going through" or "the terrible twos". Thus there is a strong tendency amongst professionals to delay making a diagnosis and to see whether a child will "grow out of it" which may in part be explained by a lack of clarity about developmental norms for behaviour in the preschool period, exacerbated by the lack of a well validated instrument specifically for diagnosing psychiatric disorders in this age group. This makes the diagnosis of preschool hyperactivity particularly challenging and may be compounded the reluctance of professionals to label the very young (Byrne, De Wolfe and Bawden, 1998).

Because of these and various methodological problems, there are few studies which have addressed the prevalence of hyperactivity in the preschool period in either general population or clinical samples. The few studies reported in the literature have in most cases looked at the occurrence of behavioural problems rather than specific diagnoses. (Richman, Stevenson and Graham, 1982; Thomas, Byrne, Offord and Boyle 1991).

Lavigne et al (1996) in one of the few studies to examine a general population sample of preschool children for psychiatric diagnoses, found prevalence rates for ADHD of 2%. Research has confirmed that the presentation of hyperactivity in preschool children mirrors that in their older counterparts in terms of pervasiveness across settings and areas of function (DuPaul, McGoey, Eckert and VanBrakle 2001). Aggressive behaviour, reduced social interactions and increased changes of activity during free play are described in the nursery setting. Comorbidity with ODD in particular is common. As with school age children, aberrant mother-child interaction and increased maternal reports of parenting stress are also reported. Affected preschool children are more likely to use medical services than their normal peers because of increased rates of accidental injury and self-poisoning (Lahey et al, 1998). In North America, 2-4% of preschool children with ADHD receive psychotropic medication (Zito, 2000).

1.12 Hyperactivity - a developmental framework

The developmental precursors of hyperactivity are poorly understood and an important focus for future research. As described above the multifarious problems experienced by children with hyperactivity can be thought to reflect deficits in self-regulation (Barkley, 1997, 2000). The construct of self-regulation is complex and its development is influenced by various factors including child specific factors, environmental factors as discussed above and the complex interaction between the child and their environment characterised in early attachment and parent-child interaction. It is in examining such processes that insights into the development of hyperactivity may be found. In particular, the preschool period is critical in the development of self-regulation and associated higher order cognition function (Kopp 1982, 1989) and may thus represent a crucial period in the emergence of hyperactivity.

1.12.1 Development of self-regulation

Kopp (1982, 1989) has examined theoretical and empirical evidence relating to development of self-regulation and concludes that it is linked to the development of higher order cognitive function. A common feature of all aspects of self-regulation is the requirement that a child flexibly adapt to situations that have standards of behaviour associated with them. Self-regulation develops through a series of phases which in turn relate to cognitive development. Success or failure in negotiating each developmental phase is influenced by the caregiver environment.

During the first months of life self-regulation is primarily concerned with the modulation of arousal. Infants differ in their capacity to do this with some experiencing difficulty self-soothing, being easily distressed and not responding well to comforting by their caregivers (Thompson, 1994). Caregivers can facilitate the development of the ability to modulate arousal by adjusting their own behaviour in response to the infant and establishing routines which delineate different arousal states.

As the infant grows they learn to adjust their behaviour in response to environmental stimuli, thus they can respond to auditory and visual stimuli by turning towards them. In this way the infant is beginning to organise their behaviour in response to the world. Factors involved in the development of this ability include inherent characteristics of the child together with environmental factors such as stimulation by a caregiver.

With further cognitive and motor development the child begins to be aware of and be able to respond to social demands. At about a year the child, in view of their increased motor abilities, will have an intense need to explore their environment which in turn will lead to increasing demands from their caregiver. Here again the interaction between the child's temperamental style and the caregiver's manner of responding may be formative in the

child's development. The activity of a hyperactive child may be channelled purposefully by a sensitive caregiver who may also help "scaffold" their attentional skills by providing appropriate direction and instruction (Schaffer, 1984).

From the second year of life onwards, with further cognitive development, the child is increasingly able to monitor their own behaviour, to differentiate themselves from others and to label emotions and desires. Here again, a sensitive caregiver will facilitate the acquisition of these abilities. The skill of self-monitoring continues to develop through the preschool years, thus the child will be able to use processes such as internalised speech to help regulate their behaviour and their developing language abilities to negotiate and obtain more information (Dunn, 1988). They also develop the ability to plan behaviour such that frustration is avoided. All of these developing capacities contribute to the child's increasing ability to modulate their behaviour according to what is required of them, that is to self-regulate.

Thus it is clear that the development of self-regulatory competence is mediated by interaction between the child and their caregiver. In this respect the child's temperamental style is important in its own right but also because of the effect it may have on the caregiver environment, for example, leading them into conflict with their caregivers. Other factors which affect the caregiver environment such as stress and parental mental illness are also important as discussed above.

1.12.2 Attachment

The earliest manifestation of the caregiver-child environment is the attachment relationship. A key task of infancy is the formation of a secure relationship with a primary caregiver i.e. an attachment. Attachment is defined as a specific, enduring and reciprocal bond between infant and caregiver. The early research on attachment developed from the

work of ethologists who described phenomena such as imprinting in chicks. Bowlby (1982) described the attachment relationship as key to the infants' physical and emotional security. Ainsworth, Bell and Stayton (1971) developed an elegant laboratory paradigm to examine the nature of attachment and on the basis of this they described three qualitatively different relationships: secure, anxious and insecure. They hypothesised that these patterns of early attachment were a reflection of the quality of the preceding mother-child relationship.

The quality of caregiver infant attachment may be important in the development of self-regulation. Thus secure attachment (i.e. being confident that mother is physically and psychologically available) allows the infant to feel safe in exploring their environment thus facilitating cognitive development, the development of attentional and problem solving skills, and ultimately self-regulation.

Compliance may be thought of as a feature of emerging self-regulation (Kopp, 1982). The relationship between attachment and compliance has been examined in the laboratory setting revealing that securely attached toddlers are more enthusiastic and persistent in their efforts to comply. In addition they are more responsive to maternal suggestions. Securely attached toddlers spend more time on task and are less verbally aggressive and negative than insecurely attached comparators (Frankel and Bates, 1990).

The relationship between early attachment and later behavioural disorders has been examined but the findings are inconsistent with some studies suggesting that early, insecure attachments are associated with later externalising behaviour problems (Erickson, Sroufe and Egeland, 1985) whilst others have failed to confirm this (Bates, Maslin and Frankel, 1985).

1.12.3 Caregiver-child interaction

There is evidence that intrusive maternal care may disrupt the child's ability to learn effective techniques for modulating arousal and sustaining attention (Sroufe, 1991). Also, early care giving may be associated with children's self-regulatory abilities via the development of cognitive and linguistic competence. Inflexible and demanding parenting combined with unrealistic expectations of child behavioural control may also be important in the emergence of delay aversion (Sonuga-Barke, 2002). In contrast, highly verbally stimulating and non-restrictive care giving predicts children's later self-control and is closely related to superior child cognitive competence at earlier ages (Olson, Bates and Bayles, 1990).

Highly directive negative parent-toddler interaction is associated with non-compliance in the child. It is normal for children to show non-compliance however the quality of the non-compliance is important, thus unskilful resistance is associated with later behavioural problems. Patterson (1982) views non compliance as a form of coercive child behaviour which is maintained by inept parenting leading to cycles of coercive interaction that are linked with later behavioural problems and peer rejection. Lee and Bates (1985) found two year old children described by their mothers as difficult, to be more negative and resistant to control. At the same time their mothers used more intrusive control strategies. Similarly Campbell, March, Pierce, Ewing and Szumowski (1991) reported that negative maternal control was predicted by non-compliant and overactive child behaviour in structured task situations. Morrell and Murray (2003) have shown that hostility, coercion and the absence of positive parenting are important in mediating child emotional dysregulation and subsequent disruptive behavioural problems. The fact that mother-child interaction improves when the hyperactive child is treated with psychostimulants is used as evidence to suggest that it is the child's behaviour that causes the negative and controlling

interaction. Other research has suggested however that restrictive, controlling behaviour is a maternal characteristic which is stable over time (Olson, Bates and Bayles, 1984).

Thus it is clear that both maternal and child factors are important in determining the nature of mother-child interaction. In this respect the child's emerging temperament may be an important factor.

1.12.4. Temperament

Temperament is defined as individual differences in responsiveness to the environment which appear early in life, show evidence of heritability and remain relatively stable within developmental periods.

'Difficultness' is not an uncommon characteristic of the early histories of hyperactive children as recounted by their mothers. Thomas, Chess and Birch, (1968) described the concept of difficultness in their study of infant temperament. Difficult infants are fussy and cry excessively, they are difficult to soothe, irregular in their habits and slow to adapt to change. These features suggest that such infants have difficulty in modulating their arousal, which may have implications for the development of self-regulation (see above).

Both prospective and retrospective studies have linked early temperament to later problems with self-regulation (Ross and Ross, 1982). It is however important to note that difficultness is a non-specific risk factor which has been linked to both internalising and externalising disorders. It is also important to be aware that temperament is not immutable and in fact shows only modest to moderate stability over developmental periods (Bates, 1987). Existing research is limited in a number of ways, particularly because the measures and conceptualisation of temperament are inadequate.

The extent to which temperamental traits predict later behavioural problems depends on how they interact with other environmental factors, thus a temperament-environment goodness of fit model may be useful (Thomas, Chess and Birch, 1968). A difficult child may overwhelm the coping capacity of a stressed parent with limited emotional and practical resources. Macoby, Snow and Jacklin (1984) described mothers of temperamentally difficult boys at 12 months as being less active in guiding their children at 18 months. The authors postulated a transactional process between the child and their mother in which the child's negative temperamental traits led to the development of an environment which further exacerbated these traits.

Activity can also be described as a dimension of temperament. The association between early activity level and later hyperactivity is uncertain. Thus it is not clear whether hyperactive preschoolers are demonstrating early hyperactivity or more general negative behaviour. However it is clear that hyperactivity disrupts the child-caregiver relationship, several studies have shown that active toddlers and preschoolers have higher rates of conflicted and coercive interactions with parents and peers (Bates, 1987).

1.13 Summary

Hyperactivity is currently conceptualised as a complex biopsychosocial disorder of the development of self-regulation with various factors involved in the causation and maintenance of the behavioural phenotype. Thus a biologically predisposed child subjected to a range of environmental stressors may present with hyperactivity. Environmental factors involved in the expression and maintenance of the disorder may include the nature of the caregiver-child relationship because of the potential role of the caregiver in the child's developing self-regulatory competence. In particular, the affective content of the relationship may be important. Thus a warm, positive, sensitive caregiver may promote the child's developing self-regulation. By contrast the caregiver-child

relationship of hyperactive children has been characterised as critical and lacking in warmth. Here parallels with the role of the affective climate in outcome of adult psychiatric illness become apparent, in particular the role of Expressed Emotion (EE).

The importance of EE in psychiatric illness has been the focus of research attention since the 1950's. Whilst its role in adult mental illness is established, less evidence is available in relation to childhood psychopathology. The following section summarises the literature in this area.

1.14 The Role of Expressed Emotion

The concept of Expressed Emotion (EE) emerged some 40 years ago from the examination of factors associated with relapse in schizophrenic patients following discharge from hospital. From there research broadened to examine the role of EE in other adult psychiatric and physical conditions, and eventually to include children (Vaughn, 1989).

1.15 Historical Aspects

In the 1950's George Brown and Colleagues at the MRC Social Psychiatry Unit in London began a programme of research examining environmental factors associated with relapse in schizophrenic patients. This coincided with the discharge from hospital of large numbers of long-stay schizophrenic patients. In many cases the improvements in their disorder provided by treatment with major tranquillizers were not maintained after discharge. The research (Brown, Birley and Wing, 1972) identified a link between the type of living group to which the patient was discharged and deterioration in symptoms; patients who returned to live with their parents or spouse were significantly more likely to relapse.

The Camberwell Family Interview (CFI) was developed to record the range of feelings and emotions seen in day to day family life. This semi-structured interview is administered to

key family members living in the household. Using the CFI, Brown, Birley and Wing (1972) identified an independent relationship between the course of schizophrenia and three aspects of family life known collectively as EE: relative's critical comments, hostility and emotional over-involvement (EOI). Two thirds of patients returning to high EE environments relapsed compared to one third of patients returning to low EE environments.

Subsequently numerous studies and meta-analyses have confirmed that EE is a robust predictor of relapse in schizophrenia (Vaughn and Leff, 1976; Butzlaff and Hooley, 1998). The relationship is strongest for patients with more chronic schizophrenia and reducing the amount of contact with relatives together with regular psychotropic medication can be protective for patients returning to high EE families. The various components of EE (criticism, hostility and EOI) have separate and different associations with outcome with EOI being associated with better social outcome whilst criticism is associated with relapse (King and Dixon, 1996).

1.16 The role of Expressed Emotion in adult pathology

Whilst the concept of EE was first developed in relation to schizophrenia it has been applied to other pathologies, including bipolar depression (Simoneau, Miklowitz and Saleem, 1998) depressive neurosis (Hooley and Licht, 1997) and Post Traumatic Stress Disorder (PTSD) (Tarrier, Sommerfield and Pilgrim, 1999). The role of EE has also been examined in relation to adult learning disability (Clerici et al., 1998), brain injury (Flanagan, 1998), physical illness such as diabetes (Koenigsberg, Klausner, Pelino, Rosnik and Campbell, 1993) and across the adult life span (Hinrichsen and Pollack, 1997). Thus EE has been implicated in the course and outcome of the range of adult physical and psychiatric pathology and research has consistently emphasised the importance of addressing EE in treatment.

1.17 Cross-cultural aspects

The cross-cultural applicability of EE has been examined and the validity of EE established in numerous countries and cultures (Mino, Inoue, Shimodera and Tanaka, 2000; Kurihara, Kato, Tsukahara, Takano and Reverger, 2000; Mozny and Votoypkova, 1992). Various authors have however commented on the importance of considering cultural differences in EE and its role in adult psychopathology. Okasha et al. (1994) examined EE and patients' perception of family criticism in predicting relapse in Egyptian depressed patients. They found a statistically significant relationship between family criticism and relapse replicating previous findings, however the criticism level that best differentiated relapsers and non-relapsers was higher than levels reported in Western studies.

Kurihara et al. (2000) compared EE in an industrialised population (Japanese) to a non-industrialised population in Bali and found that rates of EE were in general lower in the non-industrialised population. Parker, Johnson and Hayward (1988) in their study of EE patterns in Australian families of schizophrenic patients found patterns that were closer to those in North American than British families. Thus research supports the cross-cultural application of EE but it is clear that the construct of EE is culturally influenced.

1.18 Factors associated with Expressed Emotion

EE has been shown to be associated with a range of factors, including those related to the individual patient and their psychopathology and those associated with their relatives. These will be reviewed in the following section

1.18.1 The role of the patient's pathology in Expressed Emotion

Studies have shown that high EE relatives are exposed to more odd behaviour on the part of their schizophrenic relative than low EE relatives and hence it has been suggested that

some of the high EE generated by relatives of schizophrenic patients may be due to their exposure to such odd behaviour. A bidirectional, transactional model of the relationship between relatives' EE and patients psychopathology has been postulated (King, 2000; Rosenfarb, Goldstein, Mintz and Nuechterlein 1995) where both patient and parent transactional behaviours may predict subsequent patient functioning. Similarly King (2000) demonstrated that the critical comments and EOI demonstrated by the mothers of young schizophrenic patients may be more effect than cause of the schizophrenia.

1.18.2 Cognitive representations of illness

The importance of what people think and understand about their illness has been examined and it is known that there is a link between illness representation and the way an individual reacts to and copes with their illness. Similarly it has been shown that carer cognitive representations of their relatives' illness are important in terms of both carer and patient outcome in schizophrenia (Barrowclough, Lobban, Hatton and Quinn, 2001). High EE relatives are more likely to attribute a patient's symptoms and behaviours to personal and controllable factors than are low EE relatives (Weisman, Nuechterlein, Goldstein and Snyder, 2000).

In turn relatives attributions of their own abilities to control problem situations have been examined in relation to EE and it has been shown that high critical EE relatives have a more internal locus of control (LOC) than low critical EE relatives (Hooley, 1998) although research in this field is not conclusive. Nevertheless LOC may be important in the determination of EE and should be taken into consideration in family work (Bentsen, et al., 1997).

1.18.3. Subjects perception of Expressed Emotion

Bearing in mind the reciprocal nature of human interaction it is important to consider what those on the receiving end of high EE experience. It is suggested that patients with schizophrenia may not be aware of the emotions of those who care for them. In fact research has established that patients with schizophrenia can reliably identify criticism as expressed by their relatives (Scazufca, Kuipers and Menezes, 2001) and that they perceive their high EE relatives to show little warmth (McCreadie, Williamson, Athawes, Connolly and Tilak-Singh, 1994). Similarly it has been shown that schizophrenic patients with high EE relatives remember mostly unhappy, stressful interactions with their relatives compared to those with low EE relatives, suggesting that those on the receiving end of high EE find this stressful (Cutting and Docherty, 2000). These findings may be important in terms of understanding the mechanism by which high EE is associated with relapse in psychiatric illness.

1.18.4 Burden of care

The literature describes a relationship between EE and relatives perception of the burden of the schizophrenic patient (Scazufca and Kuipers, 1998). Both EE and burden measure aspects of the relationship between relatives and patients and both measures are more dependent on the relatives' appraisal of the patient's condition than on the patient's actual deficits. It has also been demonstrated that changes in perception of burden and social functioning predict changes in EE (Scazufca and Kuipers, 1998). Some authors have suggested that the concept of perceived family burden is more useful than EE in predicting outcome in schizophrenia (Levene, Lancac and Seeman, 1996).

1.18.5 State or trait?

Is EE a response characteristic of the parent (trait) or a parental response to specific circumstances or persons (state)? Schreiber, Breier and Pickar (1995) have examined this

issue in relation to schizophrenia by comparing parental EE expressed towards a child with schizophrenia compared to that expressed towards a sibling without. They found that parents expressed significantly more EOI towards the schizophrenic child and significantly more warmth towards the well child. There were no significant differences in the ratings of criticism. The authors concluded therefore that the EE variables of EOI and warmth are related to the state of the child whilst criticism is a parental trait. Other authors have suggested that the hostility component of EE may also be a parental trait which predates schizophrenic illness in a child (McCreadie, Williamson, Athawes, Connolly and Tilak-Singh, 1994).

Whilst EE is often conceptualised as a marker for family dysfunction it has been suggested that certain aspects of EE may represent markers for caring. van Os, Marcelis, Germeys, Garven and Delespaul, (2001) proposed that some of the elements of EE represent attempts by the carers to look after and cope with a relative with mental illness. They found that the presence of EE in the relative was strongly associated with the degree of family involvement in care and with the number of psychotic episodes in the previous five years. The association with family involvement was confined to EOI whereas the association with previous psychotic episodes was confined to criticism. On the basis of their results the authors suggest that the components of EE may operate as markers for different aspects of the relationship between carer and illness. Thus EOI may be a state marker for the relatives' efforts to care for patients with psychotic illness whilst high levels of criticism may be a trait marker associated with poor prognosis. They also propose that these associations might develop in reaction to a frequently relapsing illness.

1.19 Stability of Expressed Emotion

EE may not be a stable index; there is evidence to suggest that it changes over time (Lenoir, Dingemans, Schene, Hart and Linszen, 2002). Patterson, Birchwood and Cochrane

(2000) examined the course of EE in early onset, first episode schizophrenia. They found that the developmental pathways of the various components of EE were separate and that initially high levels of EOI were reduced when relatives were followed up nine months later and in 37% of cases had changed to criticism. EE status altered in 28.2% of their sample, primarily from high to low EE. EOI and criticism were linked to perceived loss and a reduction in criticism was linked to a reduction in the sense of loss. Other research however has suggested that EE is stable over time (McReadie, Robertson, Hall and Berry, 1993) whilst Boye et al (1999) propose that it is possible to identify those relatives in whom EE is stable and those in whom levels of EE may change. In this way it might be possible to target intervention.

1.20 The effect of intervention to modify Expressed Emotion on adult psychopathology

The importance of systematic research into the effect of interventions aimed at modifying EE has been emphasised (Koenigsberg and Handley, 1986) and a number of studies have examined the effectiveness of different forms of psychosocial intervention. However, there is a lack of standardisation in terms of the nature of interventions and the range of outcome measures employed in studies such that it is impossible to draw firm conclusions about effects. Nevertheless, the weight of evidence would seem to support the fact that EE can be changed by intervention and that this has a positive effect on outcome.

Leff et al. (1989) compared the effect of two types of intervention aimed at reducing EE in parents and hence preventing relapse in their schizophrenic children. Parents were randomly assigned to one of two groups, education plus family therapy or education plus a relatives group. They found the latter to be most effective. They noted the value of providing family visits in those cases where families were unable or unwilling to attend the relatives groups.

In a review of controlled outcome studies of treatment in schizophrenia Penn and Mueser (1996) found that family interventions (i.e. family psycho-education and behavioural family therapy) are highly effective for reducing EE and improving patients' relapse rates and outcomes. Research has examined shifts in relatives attributions following treatment revealing that reduction in relatives' criticism and hostility is associated with a shift towards making more universal attributions for patients' negative behaviours and more use of attributions to illness (Brewin, 1994).

Similarly, intervention has been shown to be useful in other psychopathologies. A study of psycho-educational intervention in bipolar disorder showed significant changes from high to low EE in key relatives in the treatment group compared to waiting list controls. In turn those patients living with low EE relatives had significantly fewer admissions to hospital (Honig, Hofman, Rozendaal and Dingemans, 1997).

Recently studies have begun to examine with more rigour the relative contribution of systematically applied psycho-educational intervention in the treatment of adult psychiatric illness in combination with pharmacotherapy. Thus Miklowitz et al. (2000) applied a randomised, controlled design to examine the contribution of a nine month, manual-based program of family-focused psycho-educational treatment (FFT) in the management of adults with bipolar disorder. They found that patients in the FFT group had fewer relapses and longer spells between relapses than did patients who were in the control group. The most significant effect was found in those patients whose families were high in EE.

By contrast other studies have failed to show that interventions are effective in modifying EE (Merinder et al, 1999). Such studies are useful in terms of helping to refine treatment by identifying those elements that are useful and those that are not. Unhelpful elements identified in relation to adult psychopathology include exclusion of the patient, no control

over the patients' medication or involvement with their management, short duration of intervention and lack of individual assessment (Vaughn, et al., 1992). It has also been noted that extra family interventions may increase stress on low EE families which in turn may affect relapse in their children. This provides further evidence for the importance of tailoring interventions to the needs of individual patients and their families (Linszen, et al., 1996).

1.21 The role of Expressed Emotion in child and adolescent pathology

It is only relatively recently that the concept of EE has been applied to the paediatric population both in terms of physical and psychological pathology. Existing evidence suggests that EE has a role in children and there is a developing literature in this field although to date systematic studies, particularly in very young children are few in number.

1.22 The role of Expressed Emotion in child and adolescent physical illness

The validity of EE as a concept in respect of paediatric physical illness has been established (Wambolt, O'Connor, Wambolt, Gavin and Kilnert, 2000). High levels of EE have been demonstrated in mothers of diabetic (Liakopoulou et al, 2001) and epileptic children (Hodes, Garralda, Rose, and Schwartz, 1999; Brown and Jadresic, 2000). An association between EE and treatment compliance has also been demonstrated in which children who show good compliance are more likely to have mothers who show less criticism and hostility (Otero and Hodes, 2000).

Much of the literature focuses on maternal EE but some studies have commented on the role of paternal EE. Thus in a study of child asthmatics, Gartland and Hay (1999) reported an association between high paternal EE, specifically critical comments, and high school absenteeism. The amount of time fathers reported spending with their children at weekends

was inversely related to the number of times children had an asthma-related medical contact.

The association between family relationships and risk of psychopathology in children with physical illnesses has also been examined. Hodes, Garralda, Rose and Schwartz (1999) used the CFI to interview the mothers of children with epilepsy and similarly aged healthy sibling controls. They found that mothers used significantly more EOI with a trend towards more hostility to the children with epilepsy than their non-epileptic siblings. High levels of criticism and to a lesser extent hostility were associated with child behavioural deviance, the strongest link being between criticism and maternal rated antisocial behaviour. The authors suggest that there may be value in exploring the role of psychosocial intervention in families where mothers are critical and hostile towards their epileptic children.

1.23 The role of Expressed Emotion in child and adolescent psychopathology

The literature describing the role of EE in child and adolescent psychopathology is less extensive than that for adult psychiatric disorders. Nevertheless EE has been shown to be important in several child and adolescent psychiatric disorders including obsessive compulsive disorder (Waters and Barrett, 2000), internalising disorders (Vostanis, Nicholls and Harrington, 1994) externalising disorders (Peris and Baker 2000; Olson, Bates, Sandy and Lanthier 2000), eating disorders (van Furth, 1996; Hodes and Le Grange, 1993), depression (Fennig and Carlson, 1995) and psychotic illnesses (Asarnow, Tompson, Hamilton, Goldstein and Guthrie, 1997). High levels of EE especially EOI have been shown to have a deleterious effect on the psychological health of young people with learning disabilities (Dossetor, Nicol, Stretch and Rajkhowa 1994).

In general it has been found that critical comments are more common amongst the parents of children with externalising behavioural problems whist EOI is associated with internalising disorders (Stubbe, Zahner, Goldstein and Leckman, 1993). Vostanis Nicholls and Harrington (1994) examined patterns of maternal EE in children with CD and emotional disorders and compared these with controls. Maternal warmth distinguished significantly between the three groups, with conduct disordered children experiencing less warmth than those with emotional disorders who in turn experienced less warmth than controls. Criticism also distinguished the group of conduct disordered children but of note, maternal criticism was positively associated with child behaviour ratings even within the control group.

1.24 Factors associated with Expressed Emotion in child and adolescent psychopathology

As in adult psychopathology researchers have examined various factors associated with EE in relation to child and adolescent psychiatry. Hibbs et al. (1991) examined the determinants of EE in families of children with obsessive-compulsive disorder and disruptive behaviour disorders and found that paternal psychiatric diagnosis was the only significant predictor for high-EE in fathers, whilst for mothers, child's diagnosis was a stronger predictor. In a later study the authors demonstrated a relationship between low levels of EE and satisfactory family and marital environment in children with psychopathology. High EE was associated with maternal achievement orientation and family conflict (Hibbs, Hamburger, Kruesi and Lenane 1993).

As in adult psychopathology, the relationship between EE and child psychopathology is complex and is likely that adult and child factors interact and a bidirectional transactional model may well also apply. Whilst families can cause problems in many cases the family's difficulties may be in response to a child's problems (Wambolt and Wambolt, 2000). Thus

the shared environment including aspects of parental monitoring and discipline are important in the development and outcome of externalising disorders in children. At the same time the effect of chronic illness in a child on family dynamics has been examined and shown to cause families to become more structured and less emotionally warm and communicative.

The literature describing EE in adult psychiatric disorders notes the importance of relatives' attributions about their adult child's disorder. Thus highly critical relatives frequently attribute their child's disorder to personal factors that are within the child's control. Maternal cognitions about their young child's behaviour are also known to be important. Thus mothers of school age boys with conduct problems are more likely to make hostile attributions about the behaviour, perceiving it to be within the child's control and that the behaviour is intentionally directed at the parent (Olson, Bates, Sandy and Lanthier 2000). It may be that such negative maternal cognitions about a child's disruptive behaviour begin in toddlerhood. The relationship between maternal negative cognitions and child behaviour disturbance may be mediated by the affective climate between mother and child.

1.25 The role of Expressed Emotion in hyperactivity

As described earlier mothers are typically more critical and negative towards their hyperactive children. Despite this there have been few studies which have examined the role of EE specifically in relation to hyperactivity. Marshall, Longwell, Goldstein and Swanson (1990) included EE in their examination of the relationships between parent and child affective attitudes and interactional behaviours and associated aggressive symptomatology in families of children affected by hyperactivity. EE status predicted parental interactional behaviour. The child's behaviour towards their parent, however, was

highly correlated with child aggressiveness but not their EE status regarding their parents, despite the fact that child and parent EE were highly correlated.

Schwartz, Dorer, Beardslee, Lavori and Keller (1990) described high EE in school-aged children diagnosed with hyperactivity, CD, depression or substance abuse and Peris and Baker (2000) have demonstrated that high EE in the preschool period predicts the diagnosis of ADHD at third grade.

Just as adult patients with schizophrenia are able to identify the high EE to which they are exposed, which in turn may be important in mediating the effect of EE on relapse, it is likely that children are also sensitive to high EE. It is recognised that children with hyperactivity disorders are vulnerable to low self-esteem and self-confidence and this is attributed to their experience of high levels of negative feedback about their behaviour (Weiss and Hechtman, 1993).

The mechanism by which high maternal EE mediates child disruptive behavioural problems in general and hyperactivity in particular remains to be elucidated but there is evidence that the effect may be via the child's developing capacity for self-regulation. Using structural equation modelling Eisenberg et al (2001) found that the "best fit" for the relationship between maternal EE and children's externalising behaviour and social competence was via the child's self-regulation. This is in keeping with other research (Kopp, 1982; 1989; Sroufe, 1991) which describes the role of the caregiver in the development of the child's self-regulatory competence and is particularly important in that it highlights the significance of EE in this developmental process.

1.26 Expressed Emotion in preschool emotional and behavioural problems

Whilst there is a paucity of literature describing the role of EE in child and adolescent mental illness there is even less examining its role in preschool psychopathology. However, existing research suggests that early patterns of particularly mother-child interaction may be important and predictive of later child psychopathology. The families of disruptive children are characterised by greater parental stress, unsupportive spousal relationships, maternal negativity and negative parent-child interactions, which whilst they may be the result of child behaviour problems rather than the cause, nevertheless predict later behavioural problems. Thus despite the potential role of parent-child interaction in the pathogenesis of child behaviour disorders there is little research addressing the role of EE in very young children.

Jacobsen, Hibbs and Zeigenhain (2000) have examined the relationship between maternal EE and attachment status. Ainsworth's Strange Situation (Ainsworth, Bell and Stayton, 1971) was used to assess attachment status of a non-clinical sample aged 12 to 18 months. Subjects were reviewed age 6 years when attachment status was assessed again in a laboratory observation. Maternal EE was associated with mother-child attachment security at age 6 years and in particular high EE was linked to a disorganised attachment pattern.

Baker and colleagues (Baker, Heller and Henker, 2000; Peris and Baker, 2000) have examined EE in preschool children in a community setting. Their research addressed whether high EE characterises the families of children with behaviour problems and is predictive of future behaviour problems. In addition they examined the stability of EE over time. Their findings supported previous research that critical EE characterises the families of children with disruptive behaviour problems (Stubbe, Zahner, Goldstein and Leckman 1993; Hirshfield, Bierderman, Brody, Faraone and Rosenbaum, 1997). They also reported a relationship between maternal stress and child behaviour problems and

suggested that the EE construct in mothers of preschool children may reflect maternal stress (Peris and Baker, 2000). After controlling for maternal stress they found that maternal EE was stable over the four-year period from preschool to third grade and that EE ratings predicted ADHD (diagnosed by structured interview) four years later. The relationship between EE and disruptive behaviour was once again determined by criticism and not EOI.

Baker, Heller and Henker (2000) highlighted the richness of the information yielded during the assessment of EE and commented that this was not adequately captured by their chosen coding system, The Five Minute Speech Sample (FMSS) (Magna, Goldstein, Karno, Miklowitz and Falloon 1986). This instrument was derived from the CFI as a brief measure of EE and involves the parent speaking uninterrupted for a period of five minutes about their child. The monologue is audiotaped and analysed according to a coding system. Baker and colleagues explored the possibilities of expanding the coding system and identified 36 dimensions which were coded on a 4 or 5 point scale. Some of these occurred infrequently or could not be coded reliably. Finally they identified a positive affect code (warmth, enjoying being a parent, encouraging and positive tone) and a worry score (confused about what to do, concerned or worried about the child's behaviour). Mothers of children with behavioural problems scored significantly lower on the positive affect domain and higher on worry. This research highlights the difficulty capturing the complexity of EE particularly in young children. Also it is noteworthy that there has been little work to date addressing the reliability and validity of the established measures of EE in young children (Daley, in press).

1.27 The effect of intervention on Expressed Emotion in child and adolescent psychopathology

Research describing the effect of intervention on EE in child and adolescent psychiatric disorders is limited. In one of the few studies to address this subject, Eisler et al. (2000) examined forty adolescent patients with anorexia nervosa who were randomly assigned to "conjoint family therapy" (CFT) or to "separated family therapy" (SFT) using a stratified design. The two interventions were equally effective on global measures of outcome however there were significant differences in outcome in terms of family measures of EE with SFT being superior to CFT. Critical comments between parents and patient were significantly reduced and that between parents was also diminished. Warmth between parents increased. This study highlights the possible role of interventions in modifying parental EE and suggests that the nature of the intervention may be important in determining effectiveness.

1.28 Conclusions

Current research into the causation of hyperactivity emphasises the importance of integrating what is known about the neurobiological basis of such disorders with known environmental influences. It is likely that the expression of the behavioural phenotype recognised as hyperactivity results from the interplay between various constitutional factors in the child and environmental conditions to which that child is exposed. A genetically predisposed child may evoke critical EE and inefficient parenting strategies in their caregivers, which in turn compromise the child's development of self-regulation. Taylor (1999) has commented on the need for a range of research including the examination of the relationship between biological findings and different components of disorder together with research which measures relevant aspects of the environment. In addition further research is needed to address the implications for intervention.

It is recognised that pharmacotherapy, particularly with the psychostimulants, currently provides the best relief for the core symptoms of established hyperactivity disorders in school age children. Equally it is known that psychostimulants do not treat the "whole child" and their role is less clear in preschool children where there continues to be reluctance amongst professionals and carers to use medication. To date there is limited research describing the role of early intervention in preventing the development of hyperactivity disorders in vulnerable children or the role of early intervention in preventing worsening of symptoms or the development of comorbid disorders.

The role of EE in psychiatric illness has been established. Nevertheless, this aspect of childhood psychopathology is relatively under-investigated. As described above, aspects of EE are implicated in the development of externalising behaviour problems including hyperactivity. In particular, critical intrusive care-giving is associated with the development of disordered self-regulation and therefore, hyperactivity. Existing evidence supports the fact that EE can be modified. Thus it may be possible to influence the development and course of disorders of self-regulation, including hyperactivity, by modifying caregiver-child interaction.

1.29 Aims of the thesis

The theoretical basis of this study draws upon the empirical evidence described above for the role of intrusive, critical caregiver-child interaction in the development and maintenance of hyperactivity, conceptualised as a disorder of self-regulation. In particular the study addresses the role of maternal EE in hyperactivity. The study hypothesis is that childhood hyperactivity is mediated by maternal EE. The study therefore examines the relationship between maternal EE and hyperactivity in a clinic referred sample of preschool children. In addition the effect of a specifically designed intervention

programme on aspects of maternal EE and child behaviour is examined together with the effect of modifying maternal EE on child outcome.

The specific aims are:

- To describe the nature of maternal EE in preschool children (aged three to five years) with hyperactivity disorders.
- To examine the effect of a specifically designed intervention programme on maternal EE.
- To examine the relationship between change in maternal EE and outcome in children with hyperactivity disorders.

CHAPTER 2 METHODS

2.1. Introduction

This was a pragmatic controlled intervention study of the effect on preschool children with hyperactivity of a purpose designed treatment programme aimed at modifying maternal Expressed Emotion (EE). A range of assessment measures were used to collect data describing the participants socio-demographic characteristics, development and family history together with key outcome variables (child emotional and behavioural adjustment, maternal EE and mother-child interaction) in order that the effect of the intervention could be examined and the relationship between EE and child emotional and behavioural adjustment investigated. Subjects were assessed before treatment (Time 1) and at three time points one month (Time 2), six months (Time 3) and 12 months (Time 4) following treatment. Waiting list controls were assessed at two time points, baseline (Time1) and after 10 weeks on the waiting list (Time 5). In this section, the study design will be described together with the measures used. A detailed account of the intervention is provided with an overview of the rationale for statistical analysis of the data.

2.2 Study Design

To date, the effect of intervention on maternal EE in preschool hyperactivity has not been described therefore the primary objective of this study was to examine this in a preliminary way. A controlled before and after intervention design was chosen with subjects being reviewed for up to one year such that maintenance of effect could be examined. The control group was included to examine spontaneous change in maternal EE and child behaviour over an equivalent time period to the duration of the intervention programme. The rationale for selecting this study design is explored in the Discussion section of this thesis.

2.3 Participants

2.3.1 Sampling strategy

Subjects were children between the ages of three and five years who presented with developmentally inappropriate levels of overactivity, inattention and impulsivity, and their mothers, who were recruited from consecutive referrals to the Preschool Overactivity Programme (POP) over a three year period. A control group was obtained from children who, following assessment, were on the waiting list for intervention.

2.3.2 Locating the sample

Participants were recruited from the University Department of Child and Adolescent Psychiatry based in the Royal Hospital for Sick Children, Yorkhill, Glasgow. Academic staff within the University Department have research interests in, and offer specialist clinical services for, children and young people affected by disorders of overactivity and inattention. The centre receives referrals from other child and adolescent psychiatrists, paediatricians and general practitioners. The centre offers multimodal, multidisciplinary assessment together with a range of interventions including psychosocial programmes and pharmacotherapy. In addition the centre has actively promoted early identification and treatment of children affected by hyperactivity disorders. This has involved liaison with professionals responsible for the provision of routine preschool health surveillance and education (e.g. health visitors, community paediatricians, clinical psychologists and nursery school staff).

Glasgow has a well developed system of community based child development clinics (CDC's) which are often a first point of referral for general practitioners of children presenting in the preschool period with disruptive behavioural problems. In many instances these children are managed by the CDC clinical psychology staff. The liaison described above involved discussing with CDC and nursery staff the nature of preschool

hyperactivity and the proposed intervention programme (POP). In this way frontline professionals were encouraged to refer children who, following assessment, were felt to be appropriate for POP.

The Programme comprises a group parent training programme and a group child behaviour programme. The structure, organisation and content of POP were developed from existing evidence based interventions bearing in mind the theoretical basis of the development of self-regulation and hyperactivity disorders. The range of interventions were reviewed and various techniques were incorporated to address the specific aims of treatment, that is the reduction of maternal EE and negative mother-child interaction by the promotion of positive parenting.

2.3.3 Sample size

No previous studies have examined the effect of intervention on maternal EE in childhood hyperactivity disorders. The sample size was therefore determined by practical limitations and on the basis of previous studies of intervention in Attention Deficit Hyperactivity Disorder (ADHD). Such studies have based sample size on the numbers required to demonstrate an equal effect to that seen with treatment with Methylphenidate (effect sizes of 0.7 to 1.3) (Swanson et al, 1993). The same strategy was employed by Sonuga-Barke, Daley, Thompson, Laver-Bradbury and Weeks (2001) in their study of health visitor mediated intervention in preschool hyperactivity. Such studies suggest that at least 20 subjects are required to demonstrate an effect.

The practical limitations were those of the duration of funding of the study (three years) and the size and number of treatment programmes that could be run per year. The design of POP was such that five mother child pairs could be included per programme the duration of which was 10 weeks. It was anticipated that four programmes could be run per year

making the maximum size of the sample 60. It was anticipated that there would be a waiting list for intervention and that this would provide the controls.

2.3.4 Inclusion criteria

Children aged between three and five years who presented with developmentally inappropriate levels of overactivity, inattention and impulsivity as determined by clinical assessment were invited to take part in the study. Children were required to be living at home and be looked after by their biological mothers or permanent mother substitute

2.3.5 Exclusion criteria

Children who were not in the immediate care of a mother figure who was their regular or permanent caregiver, were excluded in view of the study hypothesis. The study addresses the role of maternal EE and it was postulated that the nature of the caregiver-child interaction would be fundamentally different if the caregiver were not the child's permanent carer. Other exclusion criteria included evidence of overt neurological disease and a history of treatment with psychotropic medication within the last six months. There is evidence of a reduction in maternal criticism when hyperactive children are treated with psychostimulant medication (Barkley, Karlsson, Pollard and Murphy 1985). Children with comorbid disruptive behaviour problems were not excluded in view of the fact that such difficulties are frequently associated with hyperactivity in the preschool age group (Lavigne et al, 1996).

2.4 Outcome measures

A battery of measures was selected to examine the key variables, child psychopathology, maternal EE and the nature of the mother-child interaction, highlighted in the hypothesis and research questions. The measures were selected from existing validated instruments and were chosen on the basis of their psychometric properties and their use in research on

British samples. An alternative would have been to develop purpose designed instruments. This however would have necessitated validation exercises with unavoidable time implications and was deemed unnecessary in view of the existence of appropriate measures.

2.4.1 Background information

Socio-demographic information was obtained via a semi-structured interview administered by the researcher at the beginning of the assessment process. Details of the mother's pregnancy with the index child were obtained together with a developmental history, including information about language delay and hearing difficulties. Family history of psychiatric illness, childhood behavioural and learning problems, substance abuse and criminality were also systematically recorded.

Deprivation Category (DepCat) scores were used as a measure of the socio-economic status of participants. DepCat scores represent Carstairs deprivation scores restructured as a categorical variable. Carstairs scores based on the 1991 census are calculated using four variables: overcrowding, male unemployment, low social class, and the proportion of people within the household who do not possess a car. The range of DepCat score is from one (most affluent) to seven (most deprived) (McLoone 1991).

The child's current living circumstances in terms of their immediate carers were described and any separations from parents (defined as *"any spell of longer than one month when the child was not living with parents"*) or time in institutional care (*"any period spent in care"*) were recorded.

2.4.2 Child psychopathology

2.4.2.1 Parental Account of Children's Symptoms (Taylor, Schachar, Thorley and Wieselberg, 1986)

The Parental Account of Children's Symptoms (PACS) was developed by Taylor et al (1986) to elicit more detailed and reliable information about a child's behaviour than can be determined from questionnaires. This instrument acknowledges that parents know more about their child's behaviour than anyone else, whilst recognising that parental accounts of child behaviours may be affected by differing standards, interpretations of behaviour, and other factors such as parental mental health. PACS was originally used to explore the distinction between hyperactivity and conduct disorder (CD) in a study of child psychiatric clinic attendees (Taylor et al 1986). Hyperactivity is conceptualised by these authors as a neurodevelopmental disorder with onset in early childhood which can be distinguished from non-compliant antisocial behaviour. PACS has been shown to have adequate inter-rater reliability, internal consistency and factorial validity (Taylor et al, 1986) and has been used in the preschool population (Sonuga-Barke, Daley, Thompson Laver-Bradbury and Weeks, 2001).

PACS is a semi-structured interview administered by trained interviewers taking between 45 minutes to one hour to complete depending upon responses. It can be administered to both parents but in this case mothers were the sole respondents. Parents are asked to provide detailed descriptions of their child's behaviour in the last week in a variety of specific situations, such as reading, watching television, playing with friends or alone, or to describe behaviours shown such as disobedience and temper tantrums. Decisions and judgements about the frequency and severity of the described behaviours are made by the rater who rates the behaviour on a four-point scale of severity (0-3) based on their training and on written definitions. The scores on frequency and severity are averaged to produce an overall score for each item. Parents are then asked to recall the same behaviours over

the past year. The frequency and severity of behaviours together with age inappropriateness and resulting incapacity are combined to produce an overall rating of problem severity for each item of behaviour. In total, 44 items of behaviour are described. These are grouped into three sub-scales which are averaged to give a score from 0-3. The sub-scales are:

Hyperactivity: This includes *attention span* (rated in terms of the time spent on a single activity, rated separately for four different activities), *restlessness* (rated in terms of the amount of moving about behaviour whilst undertaking the same four activities), *fidgetiness* (rated in terms of movement of arms and legs whist undertaking the same four activities) and *activity level* (rated in terms of the amount of activity during specific activities such as mealtimes).

Conduct problems: This scale comprises items concerning temper tantrums, disobedience and destructiveness.

Emotional problems: This sub-scale relates to overt emotional disturbance and does not infer the emotional basis of symptoms. It comprises items such as misery, fear, worries, apathy, hypochondriasis and obsessionality.

PACS relies on parental report which may be seen as a limitation. The role of parental report in the assessment of childhood emotional and behavioural disturbance is the subject of debate. Some authors suggest that parental report is biased to such an extent as to be unreliable whilst other authors acknowledge the potential for bias but nevertheless demonstrate the reliability of parental report in identifying and predicting childhood behavioural disorders (Faraone, Biederman and Millberger, 1995). Taylor, Sandberg, Thorley and Giles (1991) comment that no one knows a child as well as their parents.

2.4.2.2 Self-complete questionnaires

The Behaviour Checklist (Richman, 1977) and the Preschool Behaviour Checklist (McGuire and Richman, 1986) were used to augment the information derived from the PACS. In particular the Preschool Behaviour Checklist was included as a way of trying to obtain an independent observation of the child's behavioural presentation. These particular measures were chosen in view of their appropriateness to the preschool population and the fact that they were developed from research on a British population.

Behaviour Check List

The Behaviour Check List (BCL) is a twelve-item checklist which was developed from the Behaviour Screening Questionnaire (BSQ) (Richman and Graham, 1971). The BSQ is a semi-structured interview which examines 12 aspects of a child's behaviour: sleeping, eating, bowel control, attention seeking and dependency, relationships with other children, activity, concentration, ease of control, tempers, mood, worries and fears. These aspects of behaviour have been shown to discriminate between children attending psychiatric clinics and the general population. The reliability and validity of this instrument have been established (Richman 1977).

The BCL was developed to provide a simple screening instrument to examine the same 12 aspects of a child's behaviour and thereby identify preschool age children with emotional and behavioural disorders who might require further assessment. Its usefulness in this respect has been described (Richman 1977, Richman, Stevenson and Graham, 1982). Of particular relevance to this study, the BCL includes questions on activity, concentration and control, which relate to the core symptoms of hyperactivity disorders.

The parent is asked to choose one of three or four statements about an aspect of behaviour which best describes their child over the preceding four week period. For example:

Concentrates on play indoors for 15 minutes or more

Concentration 5 –15 minutes or very variable

Hardly ever concentrates for 5 minutes on play indoors.

Not active enough

Not markedly active

Very active

Too active, won't sit still for meals or at other times for more that 5 minutes.

Preschool Behaviour Check List (McGuire and Richman, 1986)

The Preschool Behaviour Checklist (PBCL) was also derived from the BSQ and was developed to enable screening for emotional and behavioural problems in preschool children in a group setting such as nursery school. Questions from the BSQ not applicable to the group setting were removed and others added to capture information about children's emotional and behavioural adjustment in groups. The PBCL has the same structure as the BCL and has been shown to be a useful screening instrument. Inter-rater reliability, internal consistency and validity have been demonstrated using various methods (direct observation, interview, factor and cluster analysis) (McGuire and Richman 1986). It was used in this study as a quick and effective tool providing information about a child from an informant other than their mother.

2.4.3 Maternal depression

Maternal depression was assessed by means of questions derived from the Present State Examination (Wing, 1974) administered by the researcher after the PACS had been completed. The section of the PSE which explores depression was selected and administered as prescribed. The researcher (JB) underwent training in the use of this instrument. The information elicited was used to determine whether the mother currently

presented with low mood. If so the severity of this was rated as moderate or severe where moderate depression is defined as *"only moderately depressed during the past month, or deep depression for less than 50% of the time and tending to vary in intensity"* whilst severe depression is defined as *"deeply depressed for more than 50% of the past month, and tending to be unvarying in intensity"*.

2.4.4 Expressed Emotion

Maternal Expressed Emotion (EE) was assessed using the Brief EE assessment developed as part of the Institute of Psychiatry Assessment of Adversities (Quinton and Rutter, 1976, Rutter and Quinton, 1984) and incorporated in PACS (Taylor, Schachar, Thorley and Wieselberg, 1986, Taylor, Sandberg, Thorley and Giles, 1991) and the Psychosocial Assessment of Childhood Experiences (PACE) (Sandberg et al 1993, Sandberg, Rutter, Pickles, McGuinness and Angold, 2001) interviews in that form. As discussed in the Introduction section of this thesis, the attitudes and feelings expressed by a relative (EE) about a psychiatric patient have been clearly demonstrated to be an important predictor of relapse in patients with schizophrenia and other adult psychiatric disorders (Butzlaff and Hooley, 1998). EE is also associated with poor outcome and relapse in child psychiatric disorders such as depression, anxiety and disruptive behaviour disorders (Vostanis and Nicholls, 1992).

Two separate scales of EE are rated. The first deals with the mother's responses to specific probe questions whilst the second involves feelings expressed about the child at any point during the interview before or after the specific probes. The specific probes are administered in a carefully prescribed manner as follows:

"I have asked you a lot of questions about (name of child) I would like you to imagine now that I have never met him/her before and I would like you to describe him/her as a person to me.

What sort of child is he?

How would you describe him/her?

Is he/she shy or confident?

Do you find him/her easy to be friendly and affectionate with?

In what ways would you like him/her to be different?

Does he/she annoy or irritate you?

What would you pick as his/her most difficult characteristic?

Are there ways in which he/she is a problem?

What is his/her best feature do you think?"

Ratings of warmth and criticism are then applied according to clearly defined criteria. The original ratings of EE included hostility, criticism and emotional over involvement (EOI). Studies of EE in mothers of children have revealed an association between disruptive behaviour and high levels of criticism and low levels of warmth whilst no association has been demonstrated with EOI (Taylor, Sandberg, Thorley and Giles, 1991; Vostanis, Nichols and Harrington, 1994). The hostility component of EE occurs rarely in maternal accounts of young children (Daley, in press). For these reasons this study focused on warmth and criticism.

The rating of warmth was based upon a number of factors including:

- the mother's tone of voice, expression and gesture when speaking about the child
- spontaneity in expressing warmth during the course of the interview
- the expression of sympathy, concern and empathy
- the expression of enthusiasm and interest in the child.

The rater is counselled against surmising what the informant feels for her child, the rating must be based solely on what is expressed during the interview. Similarly the warmth of the mother's personality must not influence the rating, only the warmth she expresses for

her child. Maternal depression should not influence ratings as a depressed person is capable of expressing warmth. Stereotyped endearments and positive remarks are not in themselves evidence of warmth instead the rater must decide whether or not warmth is conveyed.

Similarly criteria for criticism are clearly described. Thus a criticism is a statement which by the manner in which it is expressed, constitutes an unfavourable comment upon the behaviour or personality of the person to whom it refers. The tone of voice (pitch, speed, inflection) and the content of the statement are used as the basis for rating criticism. Criticism is coded where there is a clear unambiguous statement by the mother that she dislikes, disapproves of or resents the behaviour or characteristic of the child.
The following rating scheme was used which includes a frequency count of the number of positive and critical remarks and ratings of warmth and criticism based on the whole interview (WI) and on the specific probe questions (SPQ).

Expressed Emotion rating scales

EE (SPQ)		**EE (WI)**	
Warmth		**Warmth**	
A great deal of expressed warmth	= 0	A great deal of expressed warmth	= 0
Moderate warmth	= 1	Moderate warmth	= 1
Some warmth	= 2	Some warmth	= 2
No expressed warmth	= 3	No expressed warmth	= 3

Criticism		**Criticism**	
No criticism	= 0	No criticism	= 0
Very little criticism	= 1	Very little criticism	= 1
Moderate criticism	= 2	Moderate criticism	= 2
A lot of criticism	= 3	A lot of criticism	= 3
		A great deal of criticism expressed throughout interview	= 4

Positive remarks (number of remarks)		**Critical remarks** (number of remarks)	
None	= 0	None	= 0
One or two	= 1	One or two	= 1
Three or four	= 2	Three or four	= 2
Five or more	= 3	Five or more	= 3

The researcher was trained in the use of PACS and in the assessment of EE. The assessment sessions were videotaped and rated subsequently. A research assistant was also trained in the use of these measures and coded 20% of the videotapes for the purpose of checking inter-rater reliability (Altman, 1999).

2.4.5 Mother-child interaction

Mother-child interaction was observed and videotaped in a play room equipped with a one way mirror, microphones and four remotely controlled cameras (including both wide angle and fixed lens) thus providing wide coverage of the assessment room. The assessment room was equipped with easy chairs together with child sized chairs and tables.

Mothers and children were observed interacting for 15 minutes in unstructured play and for 15 minutes in structured play. In the unstructured play session, a standard set of toys were

placed in the room including a bag containing a selection of animals and a play mat, a toy garage together with a bag containing toy cars and accompanying play mat. Mothers were instructed to *"play with their child as they were accustomed to doing at home"*. They were advised that they should feel free to use any of the toys in the room and rearrange the furniture in the room to make themselves comfortable. The mothers were aware that they were being observed and videotaped and they were informed that the purpose of the assessment was to look at how they and their child played together. It was emphasised that this was not a "test" of their parenting.

When 15 minutes had elapsed the researcher entered the room and removed the toys. The mother was then advised about the structured play session and given a page of written instructions describing three play tasks. Three labelled boxes containing the toys relevant to the three tasks were then brought into the room. Five minutes were allowed for each task and mothers were told to encourage their child to complete the tasks in the way they would at home. The same play tasks were used at each assessment:

Drawing: A set of three dot-to-dot templates were to be completed. In addition, a blank piece of paper was included on which the child could draw a picture.
Building with bricks: A box of age appropriate Lego bricks was to be used to build something of the mother/child's choosing.
Cooker, pots and pans: The child was to be asked to prepare a meal for their mother and themselves.

No directions were given to the mother as to the order in which tasks were to be completed.

A range of coding systems exist which can be used to record the complexities of mother-child interaction in relation to hyperactivity and other disruptive behavioural problems (Campbell, 1973, Cunningham and Barkley, 1979, Webster-Stratton, 1982). Many of these are derived from the Response Class Matrix developed by Mash, Terdal and Anderson (1973) which involves one observer coding mother's responses (command, command question, question, praise, negative, interaction or no response) to specific antecedent behaviours of the child (compliance, independent play, competing response, negative, question, interaction or, response). At the same time a second observer codes the child's response (compliance, independent play, competing response, negative, question, interaction or, response) to mother's antecedent behaviour (command, command question, question, praise, negative, interaction or no response).

The hypothesis of this study relates to maternal EE and the purpose of directly observing mother-child interaction was to further examine levels of maternal criticism and warmth towards the child. In this respect, the Response Class Matrix and the other schemes developed from it were of limited use as they provide little information about maternal affective expression. By contrast, the coding system developed for the Mellow Parenting Programme (Puckering, Rogers, Mills, Cox and Mattson-Graff, 1994) includes a series of affect codes. This system codes mother-child interaction according to six dimensions of parenting, anticipation, autonomy, warmth and stimulation (responsivity), co-operation, distress and control and conflict. Both mother and child behaviours are coded. In addition affect (both mother and child) can be coded throughout. Affect is divided simply into "positive" and "negative" and is rated as follows:

Positive:

Verbal: verbal approval, tone of voice, positive exclamation, laughter, comfort.

Physical: nice touch/handling, smile, cuddle, affectionate touch.

Negative:

Verbal: negative tone, harsh order, rejection, threatening, teasing, criticism, hostility, unsupportive.

Physical: aggression, slap, fierce gesture.

This system was developed for preschool age children and was originally used to rate mother-child interaction during a series of care taking tasks such as bathing or feeding. These assessments were undertaken in the home where the mothers were videotaped interacting with their child. This coding system has been shown to be reliable and to have good test-re-test and inter-rater reliability (Puckering, Rogers, Mills, Cox and Mattson-Graff, 1994).

The entire system provides a vast amount of information and not all of the dimensions were appropriate to this study, it was therefore decided to use the affect codes only. The coding involved recording the numbers of positive and negative interactions observed over the course of a prescribed sampling time frame. As described above the mothers and children were observed in the clinic setting for fifteen minutes during a free play task and then during three five minute structured tasks. For the free play task, ratings were made for minutes 1 to 3, 8 to 11 and 13 to 15. For each of the three structured tasks, ratings were made for minutes 1, 3 and 5. The researcher and a second coder were trained by one of the authors of the coding system (Christine Puckering) and inter-rater reliability was evaluated.

2.5 Procedures

The study was conducted over a three year period and was supported by the Child and Family Trust who appointed a Fulton McKay Nurse to work on the Programme. The Child and Family Trust is a Scottish based charity whose remit is the support of children. The actor, Fulton McKay was the Chairman of the Child and Family Trust for many years and

following his death the Trust have funded a programme of nurses (Fulton McKay Nurses) to work on projects addressing key areas of need in child health. This project was the first to be supported by the Child and Family Trust and upon its completion, Yorkhill NHS Trust took over the funding of the Fulton McKay Nurse (FMN) thereby ensuring the continuation of the Programme.

2.5.1 Recruitment

Children were referred to POP by other child health specialists working in the community (health visitors, nursery staff, educational psychologists, community paediatricians and child and adolescent psychiatrists) and occasionally directly by general practitioners. Following referral, children and their families were invited to attend for interview and underwent routine psychiatric evaluation by the researcher (JB) and the FMN in order to determine suitability for inclusion in the study. Mothers and children who met inclusion criteria on the basis of clinical assessment were offered the opportunity of taking part in the Programme or of attending the clinic for routine treatment. The study treatment programme and alternative treatment options were explained in detail to the mothers and their informed consent to participate was obtained. This included consent for the assessment and treatment process to be video taped. It was explained to mothers that the video material from the children's programme would be used in the mothers' treatment group to illustrate techniques and issues under discussion. Consent was also obtained for video material to be used in the teaching of other professionals. Following their agreement the mothers and their children were offered appointments to attend the clinic in order to complete the study assessment protocol.

2.5.2 Data collection

2.5.2.1 Time one

Assessments were carried out in the Department. A screening room with audiovisual facilities was used for assessments and also served as the group room for the children's treatment programme. During the course of the study, the Department was relocated to new premises. This meant that assessments and treatment programmes were accommodated in two different rooms during the course of the study. The move took place during a break between treatment programmes.

Mothers completed the socio-demographics questionnaire, the PACS including the probe questions for EE and maternal depression with the researcher. As described above the interview was videotaped to allow subsequent coding and calculation of inter-rater reliabilities. Assessment of mother-child interaction was undertaken as described above and the children then underwent a brief physical examination (including neurological examination) to exclude underlying physical abnormalities. Mothers were given copies of the Behaviour Checklist to complete, and the Preschool Behaviour Checklist to give to nursery, if appropriate. They were also provided with stamped, addressed envelopes in order to return questionnaires.

2.5.2.2 Follow-up Data collection one (Time 2) six (Time 3) and 12 months (Time 4) post intervention

A modified assessment protocol was implemented at post-treatment reviews. The review protocol was essentially the same as the initial assessment protocol other than elements which did not need to be repeated e.g. socio-demographic data and background history were omitted. Details of any significant changes in circumstances were recorded. In addition to allowing review of child and maternal progress, review appointments also provided the opportunity for *"booster sessions"* such that once the review protocol was

completed, mothers and therapists spent time reviewing management strategies and reinforcing positive mother-child interaction. The value of such booster sessions has been demonstrated (Anastopoulus and Barkley, 1989).

2.5.2.3 Control group assessments

A waiting list control group of 13 subjects was recruited who completed the baseline assessment protocol (Time 1) and the modified protocol ten weeks later (Time 5). This allowed observation of any spontaneous change in child psychopathology, maternal EE or mother-child interaction over a period of time equal to the duration of the treatment programme. Thereafter controls were included in treatment programmes as soon as possible although that data is not included in the analysis of the intervention presented here.

2.5.4 Ethical approval

The study was approved by Yorkhill NHS Trust Research Ethics Committee.

2.6 The Treatment Programme - Preschool Overactivity Programme (POP)

2.6.1 Introduction

The range of psychosocial treatment programmes for disruptive behaviour disorders, including hyperactivity was discussed in the Introduction to this thesis. The various components of POP were selected following a review of the existing evidence, to address the primary objectives of reducing maternal EE, promoting positive mother-child interaction and thereby the development of self-regulatory competence by the child. The literature review and clinical experience highlighted a number of issues which were of importance in the design of the Programme including maternal engagement, the role of the parent in promoting the development of self-control, the use of combined parent and child programmes and the range of techniques employed. The structure and organisation of POP

are described here whilst its theoretical basis is reviewed in the Discussion section of this thesis.

2.6.2 Structure and organisation

The Programme comprised a ten week intervention during which mothers and their children attended one day per week, for a period of four hours. The Programme consisted of a parent training programme and a parallel child programme. The groups were led by principal or lead therapists supported by one co-therapist in the parents groups and 5 co-therapists in the children's group. Specially designed curricula (see below) were followed in the parent and child groups. The same therapists remained in the parent and the child group throughout the course of each treatment programme.

The Programme was designed for mothers and children, fathers and other extended family members were not included in the main programme although extra-curricula activities were arranged to involve them in the work. A number of factors influenced the decision to focus the main treatment programme on mothers and children but in particular this was due to the nature of the study hypothesis. Mothers in general are the main carers of children during the preschool years. This remains the case despite the increased involvement of fathers in childcare overall. It was anticipated that a number of the mothers attending the Programme would be single parents who might feel isolated in a group where other mothers were accompanied by husbands or partners. In those cases where fathers were present and involved with their children, it was anticipated that the constraints of employment might preclude them from attending the group on a regular basis. Continuity of attendance was important in terms of the role of the group in providing support to the mothers. For these reasons it was decided that the Programme should focus on mothers and children.

A number of strategies were employed to engage other significant caregivers in the work of the Programme and thereby promote generalisation of the techniques employed and the overall philosophy. Two "relative's evenings" were run over the course of each Programme which were open to anyone the mothers wished to invite. These evenings were usually well attended by fathers and other extended family members, friends, nursery staff, health visitors and social workers who were involved with the family. Mothers were encouraged to bring along anyone whom they considered to have a significant role in their child's life. The aim was to make such family members, friends and professionals aware of the work being undertaken by the mothers such that they would be in a more informed position from which to provide support.

In addition, a detailed handbook was produced to accompany the Programme. This book which became affectionately known as the "Red Bible" (it was produced in the format of loose leave pages in a red ring binder) contained details of the work covered over the course of the Programme together with pages for homework exercises and notes. Mothers were encouraged to get their partners, husbands and other people involved with their child on a regular basis, to read the book so that they too would be aware of the changes the mothers were trying to institute and could support this process. Anecdotal reports suggest that the 'Red Bible' travelled far and wide in this respect. The parent training handbook has subsequently been published (Barton, 2000).

A maximum of five mother child pairs were included in each programme. This number was felt to be sufficient in terms of allowing opportunity for effective group work and in terms of available space bearing in mind the fact that there would be at lest five adults in the room with the children. Also the nature of the children's difficulties were such that it seemed prudent to limit numbers!

Group participants were not matched in anyway other than the nature of their disorder. Mothers and their children were included on a first come first served basis. This worked well and no group was unable to work together. Indeed in many cases friendships developed between the mothers over the course of the Programme which continued following the end of the ten week intervention.

2.6.3 Human resources

In the early stages of development of the Programme a small planning group was established including the researcher, Dr Seija Sandberg (supervisor) the FMN, and the Head Teacher of the Departments in-patient unit school. Subsequently a teacher (JL) was seconded to work on the Programme and became a third lead therapist over the course of the project.

The researcher, the FMN and JL acted as lead therapists in the parent and child groups. The nature of the child treatment programme necessitated a one to one child to therapist ratio in that the Programme includes elements of one to one as well as group work. Resources in the Department were such that it was not possible to staff the Programme at this level. A system of therapist training was therefore established whereby experienced preschool childcare workers (health visitors, nursery teachers, social workers, paediatric and psychiatric trainees) acted as therapists in the parent and child groups whilst undergoing a theoretical and experiential training. In this way it was possible to ensure a one to one child to therapist ratio in the child group and a lead and co-therapist in the parent training group.

2.6.4 Parent training programme

A parent training programme was developed based on existing evidence based programmes. Components of various programmes were selected and combined to produce

a package which would achieve the objectives of reducing maternal negative EE and promoting positive mother-child interaction (Webster-Stratton, 1998; Blakemore, Shindler and Conte 1993). In particular the Programme focused on an informational style of parenting, helping the child to understand their experiences and promoting mutual respect.

Mothers were advised of the importance of attending every week and in general attendance was excellent with very few missed sessions. This was thought to be a reflection of how enthusiastic mothers were about ensuring treatment for their children. Transport to and from the clinic was not arranged as a matter of routine but it was provided for two mothers who were travelling long distances from out-with the city, with no means of transport of their own.

The parent training programme followed a particular schedule each week other than the first session. This session was used to introduce the mothers to each other, to provide an overview of the work of the Programme and an overview of hyperactivity. The mothers had not met each other or the therapists (other than the three lead therapists) before the first day of the Programme. The first activity was therefore an introduction exercise in which the mothers were paired up with each other or with one of the therapists and asked to introduce each other after a brief period of discussion. The lead therapist modelled this. The mothers were then asked to explain what they hoped to get from their attendance at the Programme. The lead therapist again began this process by discussing their own motivations for taking part in the Programme.

Following introductions, much of the first session was taken up with education regarding the nature of hyperactivity and the aims and objectives of the treatment programme. The Child and Family Trust supported the professional production of a video about the Programme after its first year in operation. This video was used subsequently during the

first session to illustrate the Programme and give mothers an insight into the nature of the work they would be undertaking. The video included footage of mothers who had completed the Programme giving their views on the treatment programme. From week two of the Programme forward, the same schedule was followed:

Time	**Activity**
10:00 - 11:00	Feedback and review of homework
11:00 - 11:15	Coffee
11.15 - 12:00	Review video material
12:00 - 13:00	Lunch with the children
13:00 - 14:00	New educational material

To begin with, an hour was set aside for feedback during which mothers reported on their success or otherwise with homework tasks. This provided the opportunity for mothers to share with each other their experiences. It quickly became apparent that this time was of great importance to the mothers. They were able to hear first hand from other mothers about their own difficulties in managing their children's behaviour. This provided a rich resource in terms of the opportunity for mothers to learn from each other about management strategies which were and were not effective. The therapist's role in this situation became one of facilitation and reflection with some correction when inappropriate strategies were reported.

The feedback session was followed by a short break for tea and coffee. After this, video material of the children's group from the previous week was reviewed and discussed. The lead therapists selected material in order to illustrate techniques or points which had been discussed or which related to other aspects of the work being undertaken in the mothers' group.

At lunch time the mothers and children had a sandwich meal together supplied by the hospital. The meal was taken in the children's group room and was videotaped. The lead therapists remained in the screening room to be on hand if anything was needed. Mothers and children were permitted to stay in the group room for the entire lunch hour if they wished but in general mothers chose to take their children out for a breath of fresh air once lunch was finished.

Video material of lunchtime was also used in the mothers' group to illustrate various aspects of the work covered in the treatment programme. Mothers were encouraged to discuss what they were seen doing on screen. They were adept at recognising their negative or ineffective, inappropriate interventions but were less good at acknowledging when they had done something well. Emphasis was therefore placed by the lead therapists on sections of videotape of the mothers interacting with their children in a positive manner and using effective intervention strategies in order to promote maternal self-confidence and positive mother-child interaction.

After lunch the lead therapist introduced the topic of work for the coming week, discussing the theoretical aspects of the work or details of a behavioural intervention. These sessions were conducted in an informal manner with opportunity for questions and discussion. The topics covered each week were as follows:

Week	**Topic**
1.	About the Programme. What is hyperactivity?
2.	Understanding children's behaviour and play.
3.	Communicating with your child.
4.	Encouraging positive behaviour.
5.	Self-confidence: your own and your child's.

6. Helping your child to learn self-control.

7. Giving instructions. Time out.

8. Managing behaviour outside the home.

9. The future.

10. Review.

The material covered in the parent programme was orientated towards modifying maternal negative EE and promoting positive mother-child interaction. At every opportunity the mothers were encouraged to consider a situation from their child's point of view, to imagine how their child might feel and to consider how they could facilitate a positive outcome for their child and themselves.

Whilst the group was not based on psychodynamic principles it was inevitable that various group dynamics would arise. Also occasionally material of a very personal nature was raised. In such cases the lead therapist suggested to the mother that it might be more appropriate if the matter raised was dealt with outside the group. The importance of the issue was acknowledged and the mother was advised that a time would be made for her to meet with the lead therapist to attend to this.

At the end of the session a homework task was set which related to the work covered during the session. Mothers were referred to the appropriate section of the handbook and advised to review the work that had been covered during the session. Details of homework tasks appeared at the end of each section of the handbook together with self-report sheets on which to record the results of homework tasks. Mothers who had partners were encouraged to get their partners to complete homework tasks as well, with both reviewing each other's work in a mutually supportive manner.

No restrictions were imposed on mothers meeting or communicating (for example by telephone) with each other out with group times. Indeed it was felt that such contact might be a useful experience for the mothers, many of whom felt isolated because of their child's behavioural difficulties.

Mothers were advised that they could contact one of the lead therapists in between sessions should they have any problems or concerns. In particular they were advised to make contact if they were experiencing difficulties with the homework tasks. It is noteworthy that none of the mothers abused this opportunity to contact therapists. Contacts were uncommon and were invariably about significant events and concerns.

A brief questionnaire was given to the mothers at the end of the Programme to collect information about their satisfaction or otherwise with the intervention (a copy of the questionnaire is included as Appendix 3). This collected information on the mother's view about different aspects of the Programme and therapists, together with the physical accommodation and catering. In general the mothers were very positive and highlighted the value of the group experience.

2.6.5 Child programme

2.6.5.1 Structure and organisation

A parallel child behaviour therapy programme was run on the same day and at the same time as the parent training programme. An informational and motivational approach was adopted in line with the underlying principle of the parent training programme. The objective of the programme was to work on the child's core symptoms facilitating the development of self-control whilst promoting self-esteem and self-confidence. A one to one child to therapist ratio provided the opportunity for detailed and intensive work to be done with individual children in addition to group activities.

The same therapists worked with the group of children throughout the course of a treatment programme. Whilst therapists worked generally with all the children in the group, each week therapists were allocated a particular child to work with as a key worker. It was their responsibility to be aware of the child over the course of the day and to play with that child. In addition, they were responsible for the child during special play. In order to avoid children becoming unduly dependent on any one therapist, therapists worked with different children each week. This ensured that over the course of a ten week programme each therapist would be the key worker for each child on no more than two occasions.

At the end of each group session, therapists prepared a report on the child's performance. This report was combined with an overview of the activity of the group that week provided by the lead therapist. Copies of these reports were given to mothers. Reports focused on the achievements of the children over the course of the day and avoided criticism.

The children's programme followed the same schedule every week other than "special play" which was not introduced until week three. The schedule for the day was as follows:

Time	**Activity**
10:00 - 10:30	Free play session
10:30 - 11:00	Special play (from week three)
11:00 - 11:10	Juice time
11:10 - 11.30	Diary time
11:30 - 11:50	Ball pool
11:50 - 12:00	Ball game
12:00 - 13:00	Lunchtime
13:00 - 13:15	Ball-pool
13:15 - 14:00	Group games: Sleeping Lions, Listening Rabbit, Story Time, The Cave

At the beginning of each session, children were delivered to the group room by their mothers who then went on to their own group. Separation difficulties were contained by the therapists and mothers were encouraged to leave. If a mother was particularly distressed, she was encouraged to go to the screening room after about 10 minutes in order to reassure herself that her child had settled.

2.6.5.2 The rules of the play room

During the course of the first session the lead therapist took the opportunity, usually during the juice break, to discuss with the children the rules of the playroom. There were in fact very few rules and they were primarily concerned with safety. The children were told that they were in the group to have fun and that the therapists were there to ensure that they were safe. The rules of the playroom were that no one was allowed to hurt anyone else or to damage any of the toys or anything in the room. If anyone did try to hurt someone or damage something then the therapists would ask them to stop and would help them to do so if they were not able to do this for themselves. The lead therapist then went on to describe "Time Out".

2.6.5.3 Time out

Time Out was reserved for situations in which a child had hurt someone or damaged something. The procedure involved a verbal warning that the behaviour was unacceptable and must stop with an explanation as to why the behaviour was unacceptable. If this was not followed by compliance, the therapist would advise the child that he would have to go to Time Out. The child would then be taken to Time Out by the therapist. There was no specific Time Out place or chair. Instead the therapist would take the child to a quiet place in the room and would sit down with the child. No verbal contact or eye contact was made with the child until they had settled. The therapist decided when the Time Out period was

up but in keeping with other research Time Out was kept short and never exceeded five minutes.

As soon as the period was over the therapist tried to engage the child in a positive activity for which the child could then be praised. If the child returned to the activity which had resulted in Time Out, the Time Out procedure was repeated. If a child was very distressed and was physically aggressive, therapists were instructed to hold the child. In fact Time Out was used infrequently, by and large difficulties were anticipated and avoided by the therapists who distracted children onto other activities.

2.6.5.4 Activities

Free Play

The first activity of the day involved Free Play. The group room was set up in the same way each week using the same toys. Sufficient toys were laid out so that each child had something to play with and so that there were a couple of additional activities. This allowed children to change activities without providing too much choice which might have proved distracting. This was done in an attempt to keep children focused on activities. The activities available included model animals and a play mat, cars, a garage and a play mat, a cooker and pots and pans, a till and shop merchandise, dressing up clothes and books.

During the course of the free play session the therapists' role was to play with the child in a non-directive way which facilitated the child's play. Here again an informational rather than a controlling approach was employed. When children began to go off task, therapists used various strategies to reengage the child with the activity in order that they finish what they were doing. Children were not discouraged from playing with each other, indeed cooperative play was praised. However, particularly in the early stages of the Programme, much of the children's play was solitary or with the therapists. Therapists used techniques

of praise, encouragement and modelling throughout the group in order to promote positive behaviour.

Approximately five minutes before the end of the Free Play period the children were informed that the activity would be coming to an end and that they should start to bring their game to a close. This "Five Minute Warning" strategy was employed throughout the day to prepare the children for changes of activity. The mothers were encouraged to make use of this strategy in the management of their children at home. At the end of thirty minutes therapists and children tidied away the toys and the group then moved to Special Play.

Special Play

This activity was introduced on week three of the programme. The objective was to promote children's attentional skills but it also provided the opportunity to practice turn taking. The room was arranged so that each child and their therapist were able to sit at a table together. The lead therapist brought into the room a trolley containing a number of games and activities. Following an invitation from the lead therapist, each child took it in turn to choose an activity from the Special Play Trolley. The lead therapist operated a rota such that the children took turns at being the first to choose from the trolley. The children were supervised in the process of choosing by their therapist who encouraged them to look at the toys and to think about which game or activity they would particularly like to play with. The therapists also modelled this process. The children who were waiting their turn to choose were encouraged to sit at their tables during this process. The therapists modelled the appropriate behaviour and provided verbal encouragement and praise.

Once a child had chosen an activity they were encouraged to return to their table to play with the toy. Their therapist assumed a non-directive, facilitating role in order to encourage and promote the child's play. When a child appeared to be losing concentration on the activity, the therapist attempted to reengage the child. Over the course of the programme the duration of special play was increased as the children's attention span improved. At the end of the special play session the Five Minute Warning was used to prepare the children for the move to the next activity. The children were again involved in tidying up the toys and preparing the tables and chairs.

Diary Time

It is recognised that children with disruptive behaviour are vulnerable to poor self-esteem. The aim of this activity was to promote positive self-esteem. Each child was given a diary which consisted of a booklet made of several sheets of sugar paper. The child's name was written on the front page of the diary along with their photograph, taken on the first week of the Programme. Each week the therapist working with the child would talk to the child about what they had been doing that morning and tell the child what they had enjoyed about their joint activities. Therapists emphasised that they had enjoyed playing with the child and described the activities which the child had done well. The therapists then wrote a brief passage in the child's diary to this effect.

Each week the therapists reviewed entries from previous weeks to reinforce how much other therapists had enjoyed playing with the children and how well they had done. The child was told that the diary belonged to them and that at the end of the Programme they would be able to take it home to show their parents/caregivers. The children were encouraged to draw pictures and to attach stickers so that they too had contributed to their diary.

Whilst the children were preliterate and therefore not able to read the diary the period of time spent on this activity provided an opportunity to give the children positive feedback about themselves with the aim of enhancing their self-esteem. Diary time also provided a further opportunity for practising an activity which involved the child being seated at a table, focusing on a specific task. Therapists again modelled the behaviour and gave praise and encouragement to the children throughout.

Break Time

Following diary time, juice and fruit were provided to the children for their mid-morning break. The tables and chairs were left in place following diary time and the children were encouraged to sit at the table for their juice and fruit. Break time provided an opportunity for practising turn taking in that the children were involved in handing out the juice and passing the plate of fruit around the table. Therapists again used techniques of modelling and praise and encouragement to promote positive behaviour.

Ball Pool

Following Break Time the children spent a period of 15 to 20 minutes in a soft play area which included a ball pool. In preparation for this period the children had to remove their shoes and form a line ready to walk along the corridor to the ball pool. Therapists again explained and modelled the activity and encouraged appropriate behaviour. This period allowed some relaxation for the children, but also provided the opportunity for further work on turn taking and to practice stop and think strategies. The children took turns to jump into the ball pool and had to stop and think before they jumped to check that no one else was in the way. Therapists coached children through this activity.

Ball Game

Following the period in the ball pool the children returned to the group room and having put on their shoes, sat on the floor in a circle together with their therapists in order to play the Ball Game. Initially, the purpose of this game was to introduce the children to each other and to their therapists. The lead therapist explained and modelled the game for the children. The object of the game was to roll a large soft ball to someone else in the circle and, at the same time, to say the name of the person to whom the ball was being rolled. That person would then have a turn at rolling the ball to someone else. This game also provided the opportunity for further work on turn taking and impulse control.

Lunch

Following the ball game the mothers joined the children for lunch, as described above. After lunch the children then had a further period in the Ball Pool.

Group activities

For the remainder of the day, the children were engaged in group activities focusing on promoting their attention and concentration, and developing their abilities to contain their behaviour according to particular situational demands.

Sleeping Lions

The purpose of this activity was to enhance the children's ability to control motor activity and to be quiet when asked to do so. The game involved the children pretending to be lions who were sleeping in the jungle. The children and therapists were given pillows and blankets. They then lay down on the floor, and pretended to be asleep. Therapists modelled the behaviour and provided encouragement for the children. One therapist-child pair was

chosen to be the "hunters" whose job it was to walk through the jungle in search of noisy, restless lions. Children and therapists who made a noise or were restless were caught and sent to the zoo. At the end of the game one child would remain and would be pronounced the winner. As such they would be the hunter for the next game. In this way an incentive was introduced to encourage the desired behaviour together with an element of peer competition.

Listening Rabbit

The objective of this game was to promote the children's skills of attending and appropriate responding. Listening Rabbit consisted of a cardboard box painted blue with a rabbits face drawn on one side. Large ears were attached to the top of the box so that the Rabbit could "listen carefully". The children and their therapists sat in a semi-circle surrounding Listening Rabbit. Each week one of the therapists would use a variety of objects to make noises in the box. The children were encouraged to guess what was making the noise. They were encouraged to raise their hand if they knew the answer. At the end of the activity children were allowed to play with the objects they had identified and to swap them with the other children. Again therapists modelled the expected behaviour and provided encouragement and praise throughout the activity.

Story Time

The penultimate activity of the day involved reading a story to the children. The children sat on the floor in a semi-circle whilst Story Bear was brought into the room. Story Bear was a wardrobe tidy in the form of a teddy bear. Each week, a small toy or figure relating to the subject matter of the story was placed in each of the Story Bear's pockets. The children were encouraged to sit and listen to the story. Therapists modelled the expected behaviour. Once the story was over, the child who had been the most attentive and quiet

throughout the story was allowed to choose first out of Story Bear's pockets. Here again a reward was built into the activity together with an element of peer competition in order to encourage the desired behaviour.

The Cave

At the end of the day, the children and therapists built a cave out of tables and blankets. The children and one of the therapists hid inside the cave until the mothers returned to the group room to collect the children at home time, whereupon the children would jump out to surprise them! This again provided opportunities to address impulse control.

2.6.6 Therapists training programme

As described above, the Programme provided the opportunity to train therapists in group parent and child work. This proved a popular resource amongst professionals. This allowed the programme to be staffed in such a way that a one to one child to therapist ratio was possible in the child treatment programme and a co-therapist was available in the parent training programme. An additional benefit of this model of service provision was the opportunity afforded for education about child development, child behaviour disorders and their management, of staff involved in the day to day care of children. A cascade model was envisaged whereby those professionals who took part in the training could transfer their acquired skills to their own place of work.

The training comprised theoretical and experiential components. A handbook was developed describing in detail the techniques used in the Programme and the theoretical basis of the intervention. The training involved a full day of teaching prior to the treatment programme together with an hour at the beginning and end of each day of the Programme. A further day was held following the end of the ten week period for some further teaching

and debriefing. Each week the activities to be covered in the groups were described and discussed. Video material from the groups was utilised in teaching sessions. In addition "bug in the car technology" allowed direct teaching of the therapists in the children's group.

2.7 Data analysis

2.7.1 Introduction

The data analysis was designed to meet the aims of the study i.e. to provide a description of the participants including the behavioural adjustment of the children and maternal EE at baseline, to examine the associations between child behaviour and maternal EE and to examine the effect of the intervention programme in modifying maternal EE.

Because the size of the sample recruited to the study was small and recruitment was from a specialist clinic, it is unlikely that it will approximate to the general population, although it is likely that it will be representative of typical clinical samples. A descriptive analysis of the participants, subjects and controls was made at Time 1. Data were analysed using SPSS statistical software.

2.7.2 Data cleaning

The distributions of continuous variables were plotted and tabulations of categorical variables were made. Any significant outliers were investigated to check for data errors.

2.7.3 Descriptive analysis

Whilst 63 children and their mothers were recruited to the study in total, 50 as subjects and 13 as controls, some dropped out and there were some cases where data were incomplete. Therefore the total sample for any given measure may be less than 50 for participants and 13 for controls.

The scores of subjects and controls on all the baseline measures were described and compared in order to determine whether they differed significantly in anyway. The score on the two measures of EE, WI and SPQ were compared as were the scores of mother-child interaction in the two different task settings (Wilcoxon Signed Ranks tests).

2.7.4 Analysis of the intervention

Because of the nature of the data, much of the analysis required the use of nonparametric statistics. Before and after intervention comparisons of the key outcome variables (Wilcoxon Signed Ranks tests) were performed to examine the effect of the intervention programme. These were followed by time series analyses (Freidman tests) and individual analyses of changes between the various time points (Wilcoxon Signed Ranks tests) to describe the changes in more detail. Similarly comparisons between scores for key outcome variables for controls at Time 1 and Time 5 were carried out in order to see whether there was any spontaneous change over time (Wilcoxon Signed Ranks tests). Hyperactivity is frequently comorbid with conduct problems and this association was found in the participants of this study. Subjects with low conduct problem scores were compared (Mann Whitney U tests) to subjects with combined hyperactivity and conduct problems in terms of response to intervention. However the numbers involved in these analyses were small precluding any firm conclusions.

2.7.5 Relationship between hyperactivity and Expressed Emotion

The relationship between hyperactivity and EE was examined and the relationship between the various measures of maternal EE and mother-child interaction and child behavioural adjustment were further explored across the four time points (crosstabulations and Kendall's tau b). These relationships were investigated further by examining the effect of

the extent of change in EE against change in PACS after intervention (crosstabulations and Kendall's tau b).

2.7.6. Additional analyses

Having completed the analyses to examine the study hypothesis and research questions some additional analyses were undertaken to explore additional questions. The effect of the intervention on maternal mood and self-esteem was explored using Wilcoxon Signed Ranks tests. In addition regression analyses were undertaken in an attempt to identify factors, maternal and or child, which might be used to predict response to treatment.

The following section summarises the results of these data analyses.

CHAPTER 3 RESULTS

3.1 Introduction

This section presents the results of the study. The characteristics of the study participants and the details of the outcome measures are described at baseline and at the various review points. The analyses undertaken to test the original hypothesis and the research questions are presented, together with further analyses and exploratory investigations carried out to examine additional questions generated by the initial analysis. Where relevant, output from the SPSS analysis has been included in Appendix 1.

3.2 Characteristics of the study participants

A total of 63 children and their mothers were referred to the Programme during the recruitment period. Of these 50 mother-child pairs were recruited as subjects and 13 as waiting list controls. Of the subjects, three mother-child pairs dropped out at an early stage. In one case this was during baseline assessment and in the other two cases, after attending one treatment session. In all cases the reasons given for discontinuing related to the mothers' anxiety about participating in a group intervention. All were offered the opportunity of attending the clinic for individual treatment. The remaining 47 mother-child pairs completed intervention and were reviewed at three time points: one (Time 2), six (Time 3) and 12 (Time 4) months after intervention.

Controls were recruited from the waiting list for the treatment programme, that is from the same population. Thirteen mother child pairs were assessed at baseline (Time 1) and ten weeks later (Time 5). This time interval is equal to the duration of the treatment programme and was chosen in order to control for the possibility of spontaneous change in outcome measures. Data collection at Time 5 was incomplete for five mother-child pairs, this was primarily due to failure to attend for the mother-child interaction assessment. All

were however reengaged at a later date and successfully completed treatment. The characteristics of the sample are described in the following section.

3.2.1 Subjects

3.2.1.1 The children

The characteristics of the study participants (subjects and controls) are summarised in Table 3.1. Subjects were aged between 36 and 69 months at Time 1 (mean 47.49 months, SD 7.21) and there was an uneven gender distribution, representing a male to female ratio of approximately of six to one (40 males and 7 females). Subjects were more likely to be of lower socio-economic status with 70% of mother-child pairs living in areas rated as Deprivation Category (DepCat) 4 to 7 (mean 5, range 1-7, SD 1.91). The majority of families (62%) lived in council owned accommodation, 30% owned their own house and 8% lived in privately rented housing. Problems with housing such as poor state of repair of the accommodation or dampness were reported by 36% of mothers. Most families (96%) had access to a garden or communal space in which their children could play.

The children were in general cared for by both biological parents (72%) or by their mother and a father substitute (13%). In 55% of cases mothers reported concerns about their child's language development and 43 % of children had been assessed by a speech and language therapist at some point although few children were actively engaged in treatment. The majority of children (87%) were attending nursery at the time of their referral and in 58% of cases mothers reported that they believed their child to be presenting with behavioural difficulties in that setting.

3.2.1.2 The parents

Mothers of subjects were aged between 21 and 44 years (mean 30.30 years, SD 4.96) at baseline. Relatively few mothers were working with only 8% in full time employment whilst 11% worked part time to fit around their child's nursery placement. The remaining 81% of mothers described themselves as "housewives". The majority of mothers (77%) had left school between the ages of 13 and 16 years, 11% had undertaken a secretarial or technical college course, three had a range of professional qualifications, two held undergraduate degrees and one mother had started a degree course but had not finished it. Fathers were aged between 22 and 46 years (mean 32.90, SD 6.17). Most fathers (74%) were in employment at the time of referral, 55% worked regular office hours whilst the remainder worked shifts including nights in 9% of cases. Just over half of the fathers (51%) left school between the ages of 13 and 16 years whilst one father had left school at 13. Technical qualifications had been achieved by 32% of fathers whilst three held university degrees.

Maternal mood was assessed by means of questions included at the end of the Parental Account of Childhood Symptoms interview (PACS) (Taylor, Schachar, Thorley and Wieselberg, 1986) derived from the Present State Examination (PSE) (Wing, 1974). Low mood was reported by 49% of mothers at Time 1. The majority rated this as being moderately severe (defined as *"only moderately depressed during the last month or deep depression for less than 50% of the time and tending to vary in intensity"*). Two mothers reported feeling severely depressed (defined as *"feeling deeply depressed of unvarying intensity for 50% of the previous month"*).

Past history of psychiatric disorder was reported by only three mothers. In all cases this represented depressive illness which had required treatment by a general practitioner (GP) or a psychiatrist. Only one mother reported a history of childhood behavioural problems

whilst two reported having learning difficulties (one mother was taking adult education classes to learn to read and write). Similarly, few fathers were reported to have past histories of psychiatric disorder, three having previously suffered from alcohol problems. A further three were reported to have had behavioural problems as children, two had learning difficulties and one father had a history of imprisonment. The histories of past psychiatric disorder, behavioural and learning problems and imprisonment relate to different fathers.

The quality of the parental relationship over the pervious year, where appropriate (i.e. where the child was living with both biological parents or their mother and a father substitute) was assessed as part of the PACS interview. Relationships were rated as being of good quality in 61% of cases ("*a marriage typified by mutual concern and affection with no long-lasting tension or quarrels which are important when seen in the whole context of the marriage*"), 26 % as average quality ("*some tension, nagging or quarrels*"), and 13% as being of poor or extremely poor quality ("*nagging, hostility, indifference, dislike and avoidance*"). Marital discord characterised 38% of relationships between parents.

Table 3.1 Characteristics of the sample

Characteristics	Subjects	Controls
	Children	
N	47	13
Mean age (months)	47.49	48
(Range)	(36-69)	(37-57)
Gender	85% M:15% F	92% M:8% F
Cared for by both biological parents	72%	46%
Attending nursery	87%	85%
Language delay	55%	54%
Speech and language assessment	43%	31%
	Parents	
N – mothers	47	13
N – fathers	46*	12*
Mean age mother (years)	30.30	32.69
(Range)	(21-44)	(25-50)
Mean age father (years)	32.90	35
(Range)	(22-46)	(27-46)
Mean DepCat	5	5
(Range)	(1-7)	(1-7)

* For one subject and one control no information about father was available

3.2.2 Controls

3.2.2.1 The children

Controls were aged between 37 to 57 months (mean 48, SD 6.09) at baseline. There was an uneven gender distribution with a male to female ratio of 12 to1. Controls were more likely to be of lower socio-economic status with 76% of mother-child pairs living in areas rated as DepCat 4 to 7 (mean 5, range 1-7, SD 1.83). As with the subjects, most of the controls (46%) lived in council owned accommodation, 31% of families owned their own house whilst 23% lived in privately rented housing. Reports of problems with housing (dampness, poor state of repair) were made by 30% of mothers and 85 % of families had access to an outdoor play area.

Nearly half the controls (46%) lived with both biological parents or with their mother whilst having regular contact with their father (31%). Concerns about language delay were reported in 54% of cases and 31% had been assessed by a speech and language therapist. The majority (85%) were attending nursery and 46% were thought by their mothers to be presenting with behavioural problems in nursery.

3.2.2.2 The parents

Mothers of controls were aged between 25 and 50 years (mean 32.69 years, SD 6.75) and fathers between 27 and 46 years (mean 35 years, SD 5.53). Relatively few mothers (15%) were working, the majority (85%) describing themselves as "housewives". Most of the mothers (85%) had left school between 13 and 16 years of age, one had completed further secondary education and one had achieved a secretarial qualification. Fathers were aged between 27 and 46 years (mean 35, SD 5.53). Most fathers (73%) were in employment at the time of assessment, the majority (85%) having left school between 13 and 16 years of age. One had achieved further secondary education and one had gained a technical qualification.

A similar pattern of low mood to that described by the mothers of subjects was found in the mothers of controls with 62% reporting low mood at Time 1. In 46% of cases this was described as being moderately severe whilst 16% reported severe lowness of mood. One mother reported a history of depression which had been treated by her G.P. Only one mother reported a history of childhood behavioural problems and another reported having learning difficulties. Amongst the controls no history of paternal alcohol abuse was elicited. Three fathers were reported to have a history of behavioural problems as children and two had a history of learning difficulties. Parental relationships were rated as being of good quality in 33% of cases, average in 50% and poor in 17%. Discord was again a common feature of relationships being reported by 66% of mothers.

3.3 Comparison of subjects and controls

It is important to note from the outset that the controls were few in number (N = 13) and as a result the extent of comparison between subjects and controls is limited. Subjects and controls were drawn from the same clinic population and were compared in order to determine whether or not they differed significantly in terms of socio-demographic characteristics. Descriptive statistics for both subjects and controls were examined and the groups compared to determine whether the 95% confidence intervals for the means of the various measures overlapped. The results of these comparisons are shown in Table 3.2 where it can be seen that subjects and controls were similar in terms of basic socio-demographic data. There was a higher proportion of males in the control group (12:1) than amongst subjects (6:1). In order to examine for statistically significant differences between subjects and controls on these measures t tests were carried out (parametric independent samples t tests for child maternal and paternal age and non-parametric Mann Whitney U tests for DepCat and gender). None were found.

Table 3.2 Comparison of socio-demographic variables for subjects and controls

Variable			Subjects	Controls
Child N			47	13
Age (months)	Mean		47.49	48.0
	95% CI	lower bound	45.37	44.31
		Upper bound	49.61	51.68
Maternal N			47	13
Age (years)	Mean		30.30	32.69
	95% CI	Lower bound	28.84	28.61
		Upper bound	31.76	36.77
Paternal N			46	12
Age (years)	Mean		32.90	35.0
	95% CI	Lower bound	31.06	31.28
		Upper bound	34.72	38.72
DepCat N			47	13
	Mean		4.85	4.78
	95% CI	Lower bound	4.29	3.66
		Upper bound	5.41	5.88

3.4 Outcome measures at Time 1

The main outcome measures were the emotional and behavioural adjustment of the children as measured by the PACS scores and the emotional climate between the mother and child as described by the ratings of maternal expressed emotion (EE) and mother-child (M-C) interaction.

Assessments were made by the researcher (JB) and for each measure 20% of the video recordings of assessments were randomly selected and rated by a research assistant (RA) who was blinded to the treatment status of the study participants. Inter-rater reliabilities (weighted Kappas (K_w) were calculated and are reported in Table 3.3.

Table 3.3 Inter-rater reliabilities for main outcome measures

Measure		K_w
PACS	Emotional problems	.85
	Hyperactivity	.87
	Conduct problems	.86
	Maternal depression	.85
	Self esteem	.85
EE	Warmth WI	.88
	Criticism WI	.84
	Warmth SPQ	.84
	Criticism SPQ	.84
	Positive remarks	.70
	Negative remarks	.76
M-C Interaction	Structured positive	.84
	Structured negative	.79
	Unstructured positive	.77
	Unstructured negative	.75

It can be seen that for all the ratings, inter-rater reliabilities range from good to very good (Altman, 1999). The ratings were also compared using non-parametric t tests in order to

see whether there were any significant differences between the raters. No significant differences were observed.

3.4.1 Emotional and behavioural adjustment of the children

The PACS was administered to mothers and scored as described in the Methods section of this thesis. The items are grouped into three subscales (emotional problems, hyperactivity and conduct problems) with a score from 0-3 for each subscale. The scores for subjects and controls are presented in Table 3.4 and illustrated in Figures 3.1 to 3.6.

Figure 3.1 Emotional problems subjects Time 1

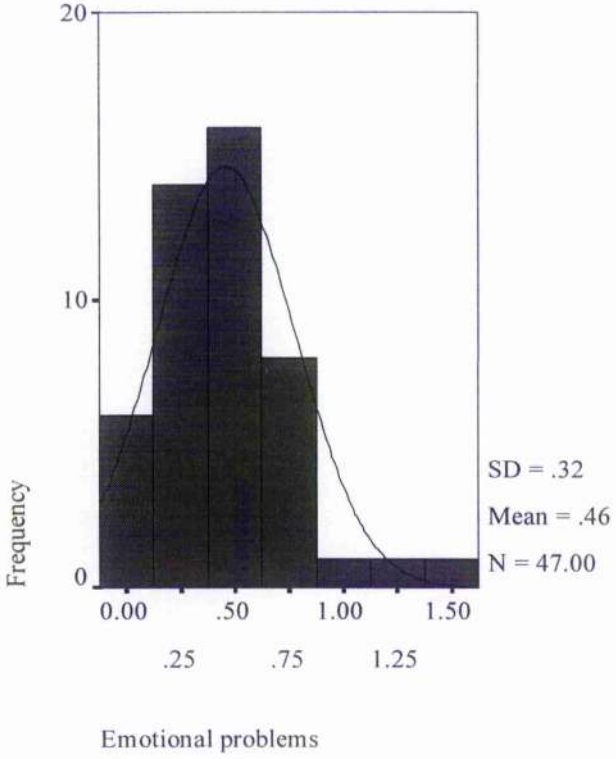

Figure 3.2 Emotional problems controls Time 1

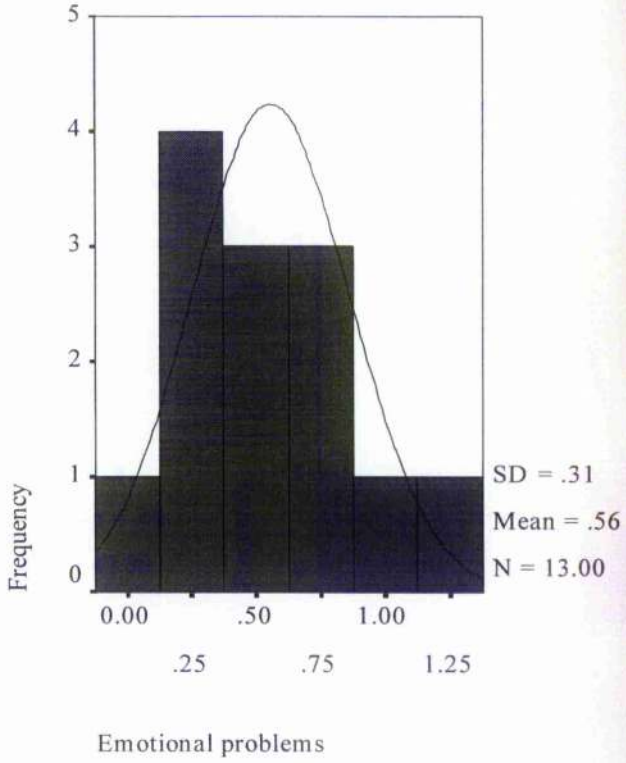

Figure 3.3 Hyperactivity subjects Time 1

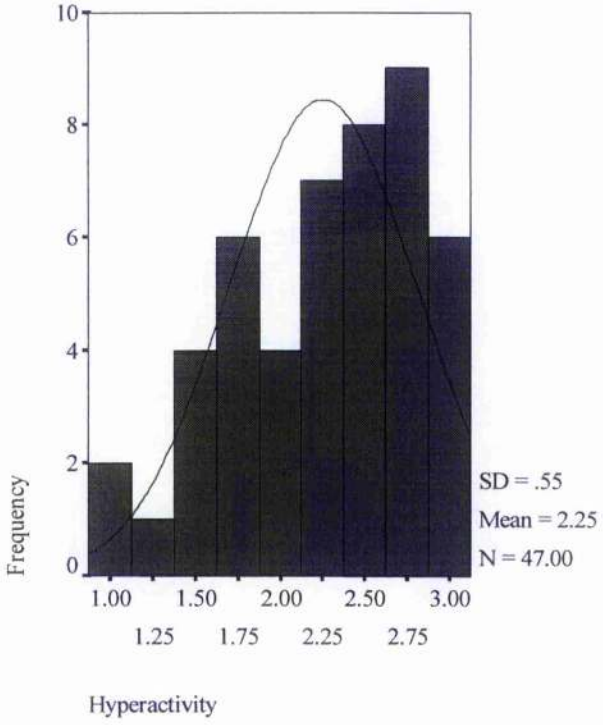

Figure 3.4 Hyperactivity controls Time 1

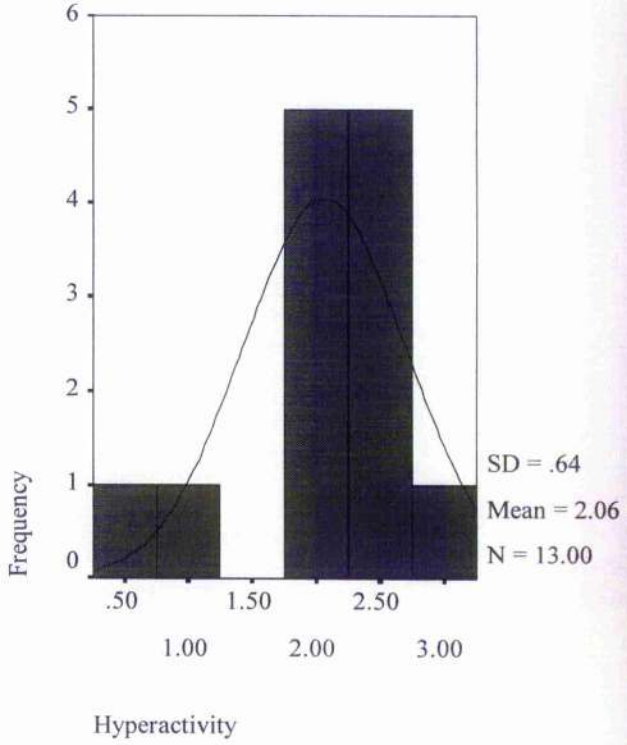

Figure 3.5 Conduct problems subjects Time 1

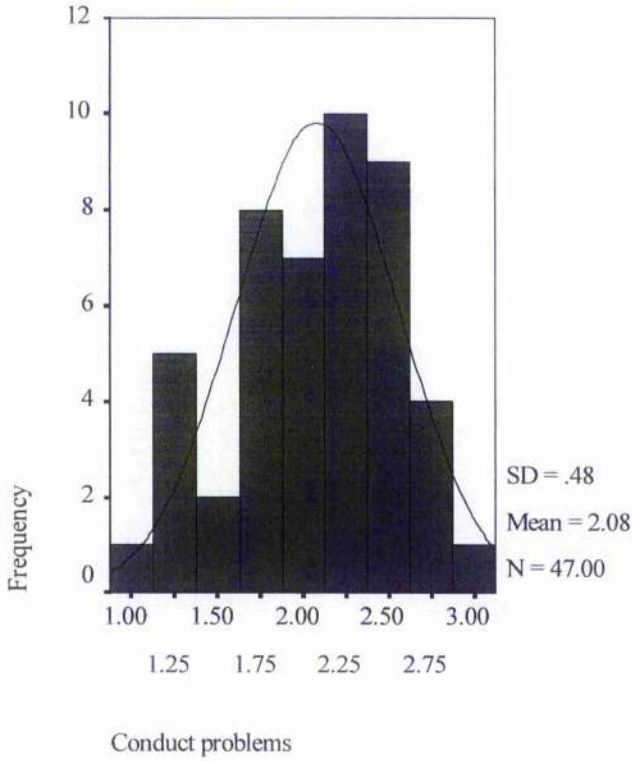

Figure 3.6 Conduct problems controls Time 1

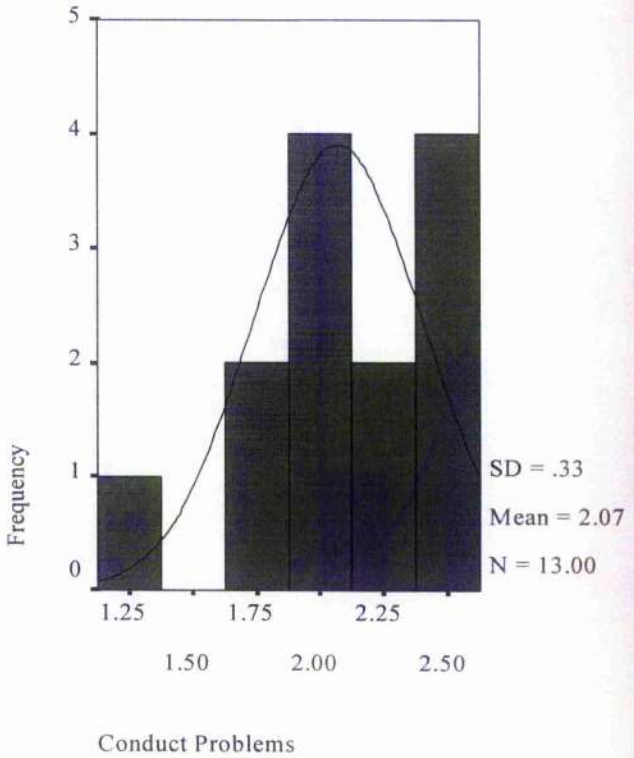

Table 3.4 PACS subscale scores for subjects and controls at Time 1

PACS subscale	Subjects	Controls
Emotional problems		
N	47	13
Minimum	0.00	0.08
Maximum	1.58	1.25
Mean	0.46	0.56
Median	0.42	0.58
SD	0.32	0.31
Hyperactivity		
N	47	13
Minimum	0.91	0.73
Maximum	3.00	3.00
Mean	2.25	2.06
Median	2.36	2.18
SD	0.55	0.64
Conduct problems		
N	47	13
Minimum	0.92	1.33
Maximum	2.92	2.50
Mean	2.08	2.07
Median	2.17	2.00
SD	0.48	0.33

As can be seen the PACS scores for subjects and controls were similar. The scores for emotional problems were positively skewed whilst those for hyperactivity and conduct

problems were negatively skewed for both subjects and controls with the skewness for hyperactivity being greater than that for conduct problems in both subjects and controls. The study sample was drawn from a specialist hyperactivity clinic which explains the relatively high scores for disruptive behavioural problems (hyperactivity and conduct problems) and the relatively low scores for emotional problems.

3.4.2 Emotional climate between mother and child

3.4.2.1 Maternal Expressed Emotion

As described in the Methods section two ratings of EE were made, one based on the whole interview (WI) and one based on the mothers responses to specific probe questions (SPQ). The scale for expressed warmth consisted of four points, *"no expressed warmth"*, *"some warmth"*, *"moderate warmth"* and *"a great deal of expressed warmth"*, for both the WI and the SPQ. The scales for criticism however differed, that for the WI consisted of five points (*"no criticism"*, *"very little criticism"*, *"moderate criticism"*, *"a lot of criticism"* and *"a great deal of criticism"*) whilst that for the SPQ consisted of four points (the same as the WI scale excluding the last point *"a great deal of criticism"*). To allow the WI and SPQ ratings to be compared, the five points in the WI scale were condensed by combining *"a lot of criticism"* and *"a great deal of criticism"*. In addition to the rating of EE the numbers of positive and critical remarks made by the mothers over the course of the interview were counted and recorded on a four point scale based on the number of remarks, *"none"*, *"one or two"*, *"three or four"* and *"five or more"*. The frequencies of the levels of warmth and criticism are expressed as percentages in Table 3.5.

Table 3.5 Frequencies of levels of Expressed Emotion for subjects and controls at Time 1

	Subjects (n = 41)			
	Whole Interview		Specific Probe Questions	
Frequency (%)	Warmth	Criticism	Warmth	Criticism
Great deal	2	64	2	55
Moderate	2	15	4	28
Some	58	6	62	0
None	25	2	19	4
Missing	13	13	13	13
Total	100	100	100	100

	Positive remarks	Critical remarks
None	53	4
1 or 2	30	6
3 or 4	4	28
5 +	0	49
Missing	13	13
Total	100	100

	Control (n = 11)			
	Whole Interview		Specific Probe Questions	
	Warmth	Criticism	Warmth	Criticism
Great deal	0	77	15	54
Moderate	0	8	15	31
Some	77	0	54	0
None	8	0	0	0
Missing	15	15	15	15
Total	100	100	100	100

	Positive remarks	Critical remarks
None	62	0
1 or 2	23	8
3 or 4	0	15
5+	0	62
Missing	15	15
Total	100	100

The majority of mothers (of both subjects and controls) were rated as demonstrating low levels of warmth and expressed few positive remarks about their children at Time 1. High levels of criticism and critical remarks were recorded.

The two ratings (WI and SPQ) were compared in order to see whether there were any significant differences in the levels of EE recorded. The data are ordinal and therefore nonparametric tests were employed (Wilcoxon Signed Ranks tests). The scales for warmth, criticism, positive and critical remarks are scored from 0 to 3. No significant differences were found between the levels of expressed warmth ($z = 1.27$ $p = .21$) and criticism ($z = 1.13$, $p = .26$) between the two different measures (WI and SPQ).

The relationship between expressed warmth and criticism was examined. The data represent ordered categories and therefore Pearson correlation which is suitable only for measurement of quantitative variables was not appropriate. Instead Spearman rank correlations or Kendall's tau statistics can be used. In particular for small samples in which there are tied observations Kendall's tau b statistic offers advantages over Spearman rank correlations in that serviceable p values can still be calculated. Where data represent ordered categories, Kendall's tau b is best calculated by constructing a crosstabulation. In this case a significant relationship was observed between the levels of expressed warmth and criticism such that high levels of criticism were associated with low levels of warmth (Kendall's tau b = 0.44, n = 41, p =.005).

3.4.2.2 Mother-child interaction

A further rating of the emotional climate between mother and child was made on a clinic based observation. Mothers were observed interacting with their child in both a structured and an unstructured play task and The Mellow Parenting coding system (Puckering, Rogers, Mills, Cox and Mattson-Graff, 1994) was used to rate levels of maternal affect

towards the child. Counts of the number of positive and negative maternal interactions in the two task settings were made according to a sampling time frame and the results recorded on a four point scale ("none", "one or two", "three or four" and "five or more") for both positive and negative interaction. Scores were recorded separately for the two task settings.

Contrary to expectations high levels of positive interaction were observed between the mothers and children and relatively little criticism. A similar pattern of positive and negative interaction was observed between control mothers and their children. The frequencies expressed as percentages of positive and negative mother-child interaction are shown in Table 3.6.

Table 3.6 Frequencies of levels of mother-child interaction during structured and unstructured tasks at Time 1

Subjects (n – 42)				
Task	Unstructured		Structured	
Frequency (%)	Positive	Negative	Positive	Negative
None	4	70	2	60
1 or 2	11	11	11	8
3 or 4	11	4	15	4
5 +	63	4	61	17
Missing	11	11	11	11
Total	100	100	100	100
Controls (n = 7)				
Task	Unstructured		Structured	
Frequency (%)	Positive	Negative	Positive	Negative
None	0	8	8	8
1 or 2	31	15	23	23
3 or 4	31	23	8	8
5 +	15	23	38	38
Missing	23	23	23	23
Total	100	100	100	100

Nonparametric statistics (Wilcoxon Signed Ranks tests) were again used to examine whether or not there were differences in the amounts of positive and negative interaction in the two task settings. There were no significant differences in the levels of positive interaction between the structured and unstructured tasks ($z = 1.10$, $p = .91$). There were however significant differences between the levels of negative interaction ($z = 2.55$, $p = .01$), mothers were more negative in the structured task than in the unstructured task. The relationships between the various mother-child interaction variables were then examined. This again involved constructing crosstabulations and calculating Kendall's tau b statistics. The results are shown in Table 3.7.

Table 3.7 Relationship between mother-child interaction variables at Time 1

Variables	τ	n	p
Structured +ve vs Unstructured +ve	.40	42	<.01
Structured -ve vs Unstructured –ve	.69	42	<.001
Unstructured +ve vs Unstructured –ve	.26	42	.17
Structured +ve vs Structured - ve	.46	42	<.01

As can be seen there are significant relationships between the measures of negative interaction and between the measures of positive interaction in the two task settings. Of note is the significant relationship between positive and negative interaction in the structured task setting where low positive interaction is associated with high negative interaction.

3.4.2.3 Relationship between Expressed Emotion and mother-child interaction at Time 1

The relationship between the two measures of the emotional climate between the mother and the child were explored. Nonparametric tests were again appropriate in view of the ordinal nature of the data. Thus crosstabulations were constructed and Kendall's tau b used to explore the relationship between the positive and negative measures of EE and mother-child interaction. A significant association was demonstrated between maternal criticism and negative mother child interaction in the structured play task (Kendall's tau b .25, n = 41, p = .05). No other significant associations were observed.

3.4.3 Comparison of subjects and controls on main outcome measures at Time 1

PACS subscale scores for subjects and controls were compared using nonparametric statistics (Mann Whitney U tests) as were EE and mother-child interaction ratings. The results are summarised in Table 3.8.

Table 3.8 Comparison between subjects and controls on main outcome measures at Time 1

Variable	z	p
PACS		
Emotional problems	1.05	.29
Hyperactivity	1.01	.31
Conduct problems	0.13	.90
EE		
EE Warmth	1.01	.31
EE Criticism	1.28	.20
EE Positive remarks	0.79	.43
EE Negative remarks	0.95	.34
Mother-Child Interaction		
M-C U/structured positive	2.67	<.01
M-C Structured positive	1.43	.15
M-C U/structured negative	4.30	<.0001
M-C Structured negative	3.02	<.01

There were no significant differences between subjects and controls in terms of PACS scores for emotional problems, hyperactivity and conduct problems or EE ratings. There were however differences between the subjects and controls in terms of some aspects of mother-child interaction. Control mothers showed significantly less warmth in the unstructured play task and were significantly more negative in both the structured and unstructured task.

3.5 Main outcome measures for subjects immediately post intervention - Time 2

3.5.1 Emotional and behavioural adjustment

Subjects PACS scores for emotional problems, hyperactivity and conduct problems were compared at baseline (Time 1) and at one month post intervention (Time 2). PACS subscale scores across Time 1 to Time 4 are shown in Table 3.11. Nonparametric tests (Wilcoxon Signed Ranks tests) were used in view of the nature of the data. As can be seen from Table 3.9. no significant change in the level of emotional problems occurred immediately following intervention. Significant changes were observed in the levels of hyperactivity and conduct problems.

Table 3.9 Comparison of main outcome measures for subjects between Time 1 - Time 2

Variable (n)	z	p
PACS (47)		
Emotional problems	0.71	.48
Hyperactivity	5.93	<.0001
Conduct problems	4.68	<.0001
EE (40)		
EE Warmth	5.24	<.0001
EE Positive remarks	5.25	<.0001
EE Criticism	5.22	<.0001
EE Critical remarks	5.23	<.0001
Mother-Child Interaction (40)		
M-C U/structured positive	1.46	.15
M-C Structured positive	2.14	.03
M-C U/Structured negative	1.09	.28
M-C Structured negative	3.13	<.01

3.5.2 Emotional climate between mother and child

Wilcoxon Signed Ranks tests were also used to examine changes in EE and mother-child interaction following intervention (Table 3.9.). Significant reductions in levels of expressed criticism were observed and these were accompanied by significant increases in the levels of expressed warmth post intervention. Reductions in the levels of negative mother-child interaction were observed in the structured task setting accompanied by significant increases in the levels of positive interaction. No changes were observed in negative or positive interaction in the unstructured task.

3.5.3 Main outcome measures for controls at Time 5

Table 3.10. shows the results of the comparison (Wilcoxon Signed Ranks tests) of the outcome measures for controls between Time 1 and Time 5 (i.e. 10 weeks from baseline).

Table 3.10 Comparison of main outcome measures for controls between Time 1 - Time 5

Variable (n)	z	p
PACS (13)		
Emotional problems	0.46	.64
Hyperactivity	1.36	.17
Conduct problems	2.05	.04
EE (11)		
EE Warmth	1.13	.26
EE Positive remarks	0.45	.65
EE Criticism	1.00	.32
EE Critical remarks	1.41	.16
Mother-Child Interaction (8)		
M-C U/structured positive	0.38	.71
M-C Structured positive	0.00	1.00
M-C U/structured negative	2.00	<.05
M-C Structured negative	0.76	.45

As can be seen for most outcome measures there were no significant differences between Time 1 and Time 5. There was however a significant change in the level of conduct problems in favour of an increase in symptoms. Also in the unstructured play task situation mothers were found to have become significantly more negative.

3.6 Main outcome variables for subjects Time 1 to Time 4

3.6.1 Emotional and behavioural adjustment

The subjects of this study were reviewed at two further time points, Time 3 (6 months post intervention and Time 4 (12 months post intervention). Table 3.11. shows the scores for

PACS emotional problems, hyperactivity and conduct problems for subjects across all time points (Time 1 to Time 4).

Table 3.11 Subjects PACS subscale scores Time 1 - Time 4

PACS subscale	T1	T2	T3	T4
N	47	47	45	36
Emotional problems				
Mean	0.46	0.42	0.32	0.28
Median	0.42	0.33	0.33	0.17
SD	0.32	0.29	0.29	0.30
Hyperactivity				
Mean	2.25	0.99	0.78	0.51
Median	2.36	0.82	0.64	0.36
SD	0.55	0.56	0.66	0.52
Conduct problems				
Mean	2.08	1.53	1.33	1.07
Median	2.17	1.58	1.5	1.17
SD	0.48	0.57	0.83	0.87

Time series analyses were undertaken on the PACS subscale scores in order to determine whether significant changes occurred in these measures over the review period. Nonparametric tests (Freidman tests) were employed in view of the nature of the data, the results are shown in Table 3.12.

Table 3.12 Time series analyses of PACS subscale scores Time 1-Time 4

PACS subscale	Chi-square	df	p
Emotion problems (n=36)	8.48	3	.04
Hyperactivity (n=36)	73.50	3	<.0001
Conduct problems (n=36)	26.34	3	<.0001

It can be seen that the results for all the analyses were significant. Thus the improvements in hyperactivity and conduct problems between Time 1 and Time 2 were maintained and significant changes in emotional problems were also found which must have occurred after Time 2. In order to explore these findings further, analyses of changes between the various time points were undertaken using Wilcoxon Signed Ranks tests. The results are reported in the following sections.

3.6.1.1 Emotional problems

As described above, no statistically significant changes were seen between Time 1 and Time 2. There was however a significant reduction in the level of emotional problems between Time 2 and Time 3 which was not maintained at Time 4 (Table 3.13.).

Table 3.13 Changes in PACS emotional problems Time 1 - Time 4

Time points (n)	z	p
T1-T2 (47)	0.71	.48
T1-T3 (45)	1.90	.06
T1-T4 (37)	1.04	.30
T2-T3 (45)	2.07	.04
T3-T4 (36)	1.36	.18

3.6.1.2 Hyperactivity

A significant reduction in hyperactivity occurred between Time 1 and Time 2 which was maintained at Time 3 and Time 4 with a further significant reduction occurring between Time 2 and Time 3 (Table 3.14.).

Table 3.14 Changes in PACS hyperactivity Time 1 - Time 4

Time points (n)	z	p
T1-T2 (47)	5.93	<.0001
T1-T3 (45)	5.82	<.0001
T1-T4 (37)	5.30	<.0001
T2-T3 (45)	2.39	.02
T3-T4 (36)	0.96	.34

3.6.1.3 Conduct problems

A significant reduction in conduct problems occurred between Time 1 and Time 2 and this was maintained at Time 3 and Time 4. However, unlike hyperactivity there was no further significant reduction between Time 2 and Time 3 or between Time 3 and Time 4 (Table 3.15.).

Table 3.15 Changes in PACS conduct problems Time 1 - Time 4

Time points (n)	z	p
T1-T2 (47)	4.68	<.0001
T1-T3 (45)	4.46	<.0001
T1-T4 (37)	4.12	<.0001
T2-T3 (45)	1.36	.17
T3-T4 (36)	0.57	.57

3.6.1.4 Individual PACS items

The findings for PACS subscale scores described above can be contextualised by examining some of the individual items over time (nonparametric times series analyses, Freidman tests) (Table 3.16.). Thus mothers reported significant changes in their children's ability to concentrate on activities such as watching television or listening to a book being read to them. Children could also play longer with their friends. Family meal times were less disrupted with mothers reporting significant reductions in the number of times children got up and down from the table. Family outings were also noticeably improved with children running away less often. The supermarket however continued to be a challenge for most with no significant improvements in children running away in that setting. Significant

improvements were noted in conduct problems with reductions in temper tantrums, disobedience and aggression. Children were also found to be significantly more co-operative with their siblings and to be in less conflict with them.

Table 3.16 Time series analyses of individual PACS items Time 1 - Time 4

PACS Item	n	Chi-square	df	p
Time watching television	33	44.12	3	<.0001
Fidgeting whilst watching television	34	11.28	3	.01
Time looking at a book	34	16.93	3	<.001
Fidgeting whilst looking at a book	34	10.39	3	.02
Time playing with others	34	22.92	3	<.0001
Up and down during meal times	34	13.47	3	<.01
Running away during family activity	34	20.99	3	<.0001
Running away at the supermarket	34	5.62	3	.13
Temper tantrums (severity)	34	35.46	3	<.001
Disobedience	34	7.98	3	<.05
Aggression	34	19.78	3	<.0001
Co-operation with siblings	34	19.42	3	<.0001
Negative interaction with siblings	34	9.50	3	.03

3.6.1.5 Questionnaire data

The Behaviour Checklist (BCL) (Richman, 1977) completed by mothers and the Preschool Behaviour Checklist (PBCL) (McGuire and Richman, 1986), completed by teachers were used to supplement data from the PACS. In particular the PBCL was introduced as a way of obtaining an independent rating of the child's presentation.

Overall the rate of return of questionnaires was not high. In general mothers rated their children as more disturbed than did nursery staff and so there was poor agreement between BCL and PBCL scores. At Time1 there was 31% agreement between mothers and nursery staff, agreement remained low at subsequent assessments. Table 3.17 summarises the BCL and PBCL scores across Time1 to Time 4 assessments. Similarly poor return rates were achieved from controls, these results are summarised in Table 3.18.

Table 3.17 Subjects BCL and PBCL results Time 1 - Time 4

Questionnaire	Assessment			
	T1	T2	T3	T4
BCL				
% return (n)	68 (32)	60 (28)	49 (23)	23 (11)
% > cut off (n)	94 (30)	75 (21)	65 (15)	52 (6)
PSBCL				
% return (n)	59 (24)	51 (21)	47 (21)	30 (12)
% > cut off (n)	42 (10)	24 (5)	29 (6)	41 (5)

Table 3.18 Controls BCL and PBCL results Time 1 - Time 5

Questionnaire	Assessment	
	T1	T5
BCL		
% return (n)	54 (7)	38 (5)
% > cut off (n)	100 (7)	80 (4)
PSBCL		
% return (n)	45 (5)	45 (5)
% > cut off (n)	40 (2)	40 (2)

The low numbers of questionnaires returned limited the possibilities for statistical analyses, thus prohibiting any firm conclusions. Wilcoxon Signed Ranks tests were used to examine for differences in both BCL and PBCL scores across the time points. Significant reductions in BCL were seen across Time 1 to Time 3 but not at Time 4. No significant changes were seen in PBCL scores over time (Table 3.19). The relationships between BCL and PBCL scores were examined by means of a chi-square analysis. No significant relationships were found.

Table 3.19 Changes in subjects BCL and PBCL scores across Time 1-Time 4

Questionnaire	z	p
BCL		
T1 – T2	2.24	.03
T1 – T3	2.24	.03
T1 – T4	1.41	.16
T2 – T3	0.45	.66
T3 – T4	0.00	1.00
PBCL		
T1 – T2	0.38	.71
T1 – T3	0.00	1.00
T1 – T4	1.73	.08
T2 – T3	0.00	1.00
T3 – T4	1.63	.10

The relationships between questionnaire scores and PACS subscale scores were examined. Firstly PACS scores were transformed into high and low categories with the cut off point being set at 1.5. Crosstabulations were then constructed and Kendall's tau b applied.

Significant relationships were found only between PACS conduct problems and BCL (Kendall's tau b, .49, n = 28, p .05) and PBCL (Kendall's tau b, .33, n = 23, p .05) at Time 2.

3.6.2 Emotional climate between mother and child

3.6.2.1 Expressed Emotion

Nonparametric time series analyses (Freidman tests) were also used to examine changes in the levels of EE over time. As can be seen from Table 3.20 significant changes in both warmth and criticism were found representing reductions in the levels of expressed criticism and increases in the levels of expressed warmth.

Table 3.20 Time series analyses of Expressed Emotion variables Time 1 - Time 4

EE Variable	n	Chi-square	df	p
Warmth (WI)	27	44.82	3	<.0001
Warmth (SPQ)	27	52.70	3	<.0001
Criticism (WI)	27	30.01	3	<.0001
Criticism (SPQ)	27	44.90	3	<.0001
Positive remarks	27	35.58	3	<.0001
Critical remarks	27	38.89	3	<.0001

Further analyses were undertaken using nonparametric tests (Wilcoxon Signed Ranks tests) to examine changes in levels of EE across the four time points. A statistically significant increase in warmth (both ratings WI and SPQ) was noted between Time 1 and Time 2 which was maintained at Time 3 and Time 4 but with no further significant increase (Table 3.21). The results shown are those for the specific probe questions (SPQ). It was demonstrated above that there were no statistically significant differences between the

ratings of EE based on the whole PACS interview (WI) and those based on the specific probe questions (SPQ) at Time 1 and this was confirmed for all time points. (NB maternal warmth was scored from 0 = a great deal of warmth to 3 = no warmth whilst criticism was scored from 0 = no criticism to 3 = a lot of criticism. The numbers of positive and critical remarks were scored from 0 = none to 3 = five or more).

Table 3.21 Changes in maternal warmth Time 1 - Time 4

Time points (n)	z	p
T1-T2 (40)	5.24	<.0001
T1-T3 (36)	4.87	<.0001
T1-T4 (30)	4.63	<.0001
T2-T3 (39)	1.21	.23
T3-T4 (30)	0.00	1.00

Significant reductions in levels of criticism were noted between Time 1 and Time 2 and these were maintained at Time 3 and Time 4. As with the ratings of warmth, there were no further significant changes in criticism between Time 2 and Time 3 or between Time 3 and Time 4 (Table 3.22).

Table 3.22 Changes in maternal criticism Time 1 - Time 4

Time points (n)	z	p
T1- T2 (40)	5.22	<.0001
T1-T3 (36)	4.76	<.0001
T1-T4 (30)	4.18	<.0001
T2-T3 (39)	0.65	.52
T3-T4 (30)	1.61	.11

The number of positive and critical remarks expressed by mothers of subjects was also compared across the four time points (Tables 3.23 and 3.24). Statistically significant increases in positive remarks and decreases in critical remarks occurred between Time 1 and Time 2 and these changes were maintained at subsequent reviews.

Table 3.23 Changes in maternal positive remarks Time 1- Time 4

Time points (n)	z	p
T1- T2 (40)	5.25	<.0001
T1-T3 (36)	4.82	<.0001
T1-T4 (29)	4.11	<.0001
T2-T3 (39)	1.79	.07
T3-T4 (29)	1.33	.18

Table 3.24 Changes in maternal critical remarks Time 1 - Time 4

Time points (n)	z	p
T1-T2 (40)	5.23	<.0001
T1-T3 (36)	4.79	<.0001
T1-T4 (29)	4.10	<.0001
T2-T3 (39)	0.76	.45
T3-T4 (29)	1.57	.12

3.6.2.2 Mother-child interaction

Nonparametric time series analyses (Freidman tests) were used to examine mother-child interaction over time. The findings are summarised in Table 3.25.

Table 3.25 Time series analyses of mother-child interaction Time1-Time 4

M-C Variable	n	Chi-square	df	p
Structured play + ve	25	6.25	3	.100
Structured play – ve	25	17.18	3	<.001
Unstructured play + ve	25	7.03	3	.07
Unstructured play – ve	25	5.46	3	.14

As can be seen no statistically significant changes were observed in the levels of maternal positive interaction over time. Significant changes were observed however in the levels of negative interaction in the structured task setting in favour of a reduction in levels of

negativity. These findings were further explored by means of Wilcoxon Signed Ranks tests applied across the four time points (Table 3.26).

Table 3.26 Changes in mother-child interaction variables Time 1 - Time 4

Variable	n	z	p
Unstructured Positive			
T1 – T2	40	1.46	.15
T1 – T3	35	2.75	<.01
T1 – T4	29	1.25	.21
T2 – T3	39	0.72	.47
T3 – T4	30	1.41	.16
Unstructured Negative			
T1 – T2	40	1.09	.28
T1 – T3	35	2.40	.02
T1 – T4	29	0.82	.41
T2 – T3	39	0.00	1.00
T3 – T4	30	1.00	.32
Structured Positive			
T1 – T2	40	2.14	.03
T1 – T3	34	2.05	.04
T1 – T4	29	1.02	.31
T2 – T3	38	0.00	1.00
T3 – T4	30	1.89	.06
Structured Negative			
T1 – T2	40	3.13	<.01
T1 – T3	34	2.90	<.01
T1 – T4	29	2.28	.02
T2 – T3	38	1.89	.06
T3 – T4	30	0.33	.74

The significant reductions in the amount of observed negative mother-child interaction in the structured task setting between Time 1 and Time 2 were maintained at Time 3 and Time 4. A significant decrease in negative interaction also occurred in the unstructured

task setting between Time 1 and Time 3. The significant increase in positive interaction in the structured play task between Time 1 and Time 2 was maintained at Time 3 but not Time 4 and there was a significant increase in positive interaction in the unstructured task between Time 1 and Time 3.

3.6.2.3 Relationship between Expressed Emotion and mother-child interaction

The relationships between the measures of the emotional climate between mother and child were examined across all four time points by constructing crosstabulations and calculating Kendall's tau b. The results are presented in Table 3.27.

Table 3.27 Relationship between Expressed Emotion and mother-child interaction Time1 - Time 4

EE vs Mother-child interaction (Task setting)	τ	n	p
Warmth and M-C +ve interaction			
Structured task			
T1	.08	41	.58
T2	.28	43	<.05
T3	.28	38	.09
T4	.49	29	<.05
Unstructured task			
T1	.02	41	.90
T2	.20	43	.20
T3	.27	39	.19
T4	.30	29	.14
EE Criticism and M-C -ve interaction			
Structured task			
T1	.32	41	<.01
T2	.23	43	.30
T3	.34	38	.09
T4	.21	29	.37
Unstructured task			
T1	.18	41	.16
T2	.21	43	.17
T3	.38	39	.06
T4	.29	29	.12

As can be seen the significant relationship between maternal criticism and negative mother-child interaction in the structured play task at Time 1 reported earlier was not maintained. A significant relationship was found at Time 2 and Time 4 between EE warmth and positive mother-child interaction in the structured play task.

The relationship between change in EE and change in mother-child interaction was also examined across the four time points using Kendall's tau b statistic. No significant relationships were found.

3.7 The role of Expressed Emotion in mediating child behaviour

Previous research has described a relationship between maternal criticism and child disruptive behaviour. Similarly a relationship has been described between child emotional problems and emotional over-involvement (EOI). The hypothesis of this study is that child hyperactivity is mediated by maternal EE especially criticism and so the relationship between maternal EE and hyperactivity was further examined. In view of the common comorbidity of hyperactivity and conduct problems the relationship between EE and conduct problems was also explored.

3.7.1 The relationship between hyperactivity and criticism at Time 1

The results presented so far show that in general mothers were rated as expressing high levels of criticism at Time1 whilst children were rated as showing high levels of hyperactivity. At Time 2, significant reductions were observed in levels of maternal criticism accompanied by significant reductions in levels of hyperactivity. In order to explore the relationship between hyperactivity and criticism, hyperactivity scores were first transformed to nominal data (dividing the scores into high and low categories) as were the scores for criticism. A crosstabulation was then constructed and Goodman and Kruskal's Lambda used to determine whether membership of one category (high or low hyperactivity) predicted membership of the other (high or low maternal criticism). A significant association was found (Goodman and Kruskal's Lambda 0.02 ($p < .05$) (criticism dependent), 0.02 ($p < .05$) (hyperactivity dependent).

3.7.2 The relationship between child behavioural adjustment and maternal Expressed Emotion

Having confirmed the association between hyperactivity and criticism, the details of the relationship between child behavioural adjustment and maternal EE were further examined. In the first instance PACS scores were converted into a categorical scale of 0-3 to match the EE scale. Thus a score 0 = 0, 0 to 0.9 = 1, 1 to 1.9 = 2 and 2 to 3 = 3. The relationship was then examined by means of constructing a series of crosstabulations and applying Kendall's tau b. The results of these analyses are summarised in Table 3.28.

Table 3.28 Relationship between Expressed Emotion and child behavioural adjustment Time 1 - Time 4

PACS vs EE	τ	n	p
Hyperactivity vs criticism			
T1	0.28	41	.78
T2	2.87	44	<.01
T3	4.03	41	<.001
T4	1.92	32	<.05
Hyperactivity vs warmth			
T1	0.04	41	.97
T2	3.43	44	<.001
T3	2.52	41	<.05
T4	1.55	32	.12
Conduct problems vs criticism			
T1	-0.48	41	.63
T2	4.39	44	<.001
T3	5.21	41	<.001
T4	4.69	32	<.001
Conduct problems vs warmth			
T1	0.92	41	.36
T2	3.78	44	<.001
T3	4.07	41	<.001
T4	3.33	32	<.001

As can be seen, relationships were found between low maternal warmth and high maternal criticism and child disruptive behaviour, hyperactivity and conduct problems. The fact that there was apparently no significant relationship between these variables at Time 1 is explained by the extreme skewness of the data.

The relationship between EE and child behavioural adjustment was further explored by categorising subjects depending on whether their mothers demonstrated a reduction in levels of criticism by 0, 1, 2 or 3 scale points at Time 2. Reduction in hyperactivity was

categorised in the same way (using the categorical scale for PACS scores described in section 3.7.2). The relationship between reduction in criticism and reduction in hyperactivity was then examined by applying Kendall's tau b statistic. An association was found between the extent of reduction in criticism and the extent of reduction in hyperactivity. Thus mothers who achieved a greater reduction in criticism reported greater reduction in hyperactivity at Time 2. Similar analyses were carried out for change in criticism and warmth against hyperactivity and conduct problems across Time 1 to Time 4 and the results of these analyses are summarised in Table 3.29.

Table 3.29 Relationship between change in PACS and Expressed Emotion variables

	PACS	n	τ	p
Change Criticism				
Hyperactivity	T2	40	.30	.02
	T3	36	.47	.001
	T4	30	.21	.10
Conduct problems	T2	40	.20	.13
	T3	36	.38	<.01
	T4	30	.31	.05
Change Warmth				
Hyperactivity	T2	40	.16	.33
	T3	36	.19	.19
	T4	30	.10	.50
Conduct problems	T2	40	.04	.79
	T3	36	.27	.04
	T4	30	.12	.44

It can be seen that there is a significant relationship at Time 2 and Time 3 between change in criticism and change in hyperactivity. No significant relationship between change in warmth and change in hyperactivity is observed. The relationship between change in criticism and change in conduct problems is not significant at Time 2 but is so subsequently. The relationship between changes in levels of expressed warmth and change in conduct problems is significant only between at Time 3.

The majority of subjects in this study presented with comorbid hyperactivity and conduct problems, very few presented with hyperactivity as their only behavioural problem. The data were examined to see whether there were differences between those children with hyperactivity alone and those with comorbid conduct problems. In fact only six children presented with scores on the conduct problems scale of less than 1.5. No significant differences were found in their response to treatment either in terms of their levels of emotional and behavioural problems or in the levels of maternal EE.

The results of these analyses confirm the previously described relationship between disruptive behaviour disorder (hyperactivity and conduct problems) and maternal criticism.

3.8 Predicting response to intervention

The results presented so far have revealed that following intervention significant reductions in levels of hyperactivity and conduct problems were observed which were maintained at follow up one year later. Multiple regression was employed to examine whether predictors to treatment response could be identified. Several regression analyses were undertaken using hyperactivity at Time 2, change in hyperactivity level and change in maternal criticism as the dependent variable in separate analyses. Factors entered into the regression included child variables such as age, PACS variables, gender, maternal

variables such as EE at baseline (warmth and criticism), depression, self-esteem, and family factors such as marital discord and DepCat. The results of these analyses were unremarkable. Level of hyperactivity post intervention was predicted only by hyperactivity at baseline ($t = 4.64$, $p < .001$). No other significant predictors were identified.

Bearing in mind the study hypothesis that child behavioural adjustment is mediated by maternal EE a composite score was constructed representing an overall description of maternal emotional expression. This involved summing all the EE variables (criticism WI + criticism SPQ, + warmth WI + warmth SPQ + critical remarks + positive remarks) in order to create a more numerically diverse variable which could then be used in a multiple regression. Again analyses were unremarkable in that change in this composite variable after intervention was predicted only by the variable at baseline ($t = 2.62$, $p < .05$).

3.9 Maternal mood and self esteem

Maternal depression has been described in the mothers of children with hyperactivity. In this study, 51% of mothers overall (subjects and controls) reported low mood at Time 1. In 88% of cases this was reported as being of moderate severity whilst 12% reported severe depression. At Time 2, there was no statistically significant change in the number of mothers of subjects reporting depression although there was a trend in favour of fewer mothers reporting low mood. No change was observed in level of depression reported by mothers of controls between Time 1 and Time 5.

Similarly mothers of hyperactive children have been reported to feel deskilled and lack confidence. Maternal self-esteem was rated as part of the assessment of maternal mood. At Time 1, 37% of mothers overall reported feeling inferior in comparison to their peers. In 87% of cases this was reported as moderate inferiority ("*some inferiority, not amounting to feelings of worthlessness or if subject considers themselves to be worthless this is present*

less than 50% of the time") whilst in 13% of cases this was severe (*"subject considers themselves to be completely worthless. Symptoms present more than 50% of the month"*). In most cases mothers related this directly to the difficulties they were experiencing in managing their child.

At Time 2, 30% of mothers reported feeling inferior with 71% reporting this as moderate whilst 29% reported this as marked inferiority. The changes in maternal self esteem between Time 1 and Time 2 were not statistically significant although there was a change in the direction of improved self-esteem. No change was observed in the self-esteem of control mothers between Time 1 and Time 5.

3.10 Missing data

In general attendance for assessments was good with a low default rate. A number of assessments were considered to be incomplete, either because assessments were missed or because the observational measures could not be recorded due to technical problems with recording equipment. Overall the amount of missing data was not considered to significantly affect the findings of the study. The completeness of the various data across time points is listed in Tables 3.30. and 3.31.

Table 3.30 Data completeness for subjects across Time 1 - Time 4

Time Point	PACS % (n)	EE % (n)	M-C Interaction % (n)
T1	100% (47)	87% (41)	89% (42)
T2	100% (47)	89% (42)	96% (45)
T3	96% (45)	87% (41)	85% (40)
T4	79% (37)	68% (32)	70% (33)

Table 3.31 Data completeness for controls at Time 1 and Time 5

Time Point	PACS % (n)	EE % (n)	M-C Interaction % (n)
T1	100% (13)	84% (11)	76% (10)
T5	100% (13)	84% (11)	69% (9)

No significant differences were found between those who dropped out and those who continued in the study in terms of socio-demographic data (Table 3.32). Also the mean scores for PACS subscales at baseline of those subjects who dropped out across the study were very similar to those of the subjects who remained in the study throughout (Table 3.33). Nonparametric statistics (Mann Whitney U tests) were used to compare dropouts with subjects who remained in the study in terms of the main outcome variables (PACS, EE and Mother-child Interaction). No significant differences were found.

Table 3.32 Comparison of socio-demographic data for subjects and dropouts

Variable			Subjects	Dropouts
Child n			37	10
age (months)	Mean		48.08	46.90
	95% CI	Lower bound	45.62	41.64
		Upper bound	50.54	52.16
Maternal n			37	10
Age (years)	Mean		30.16	29.00
	95% CI	Lower bound	28.63	25.71
		Upper bound	31.69	32.29
Paternal n			37	9*
Age (years)	Mean		33.19	30.78
	95% CI	Lower bound	31.19	27.30
		Upper bound	35.18	34.25
DepCat n			37	10
	Mean		4.89	5.2
	95% CI	Lower bound	4.21	4.20
		Upper bound	5.57	6.20

* For one dropout no information about father was available

Table 3.33 Mean PACS subscale scores for subjects and dropouts at Time 1

PACS subscale	Participants (n)	Dropouts (n)
Emotional problems	0.46 (47)	0.42 (10)
Hyperactivity	2.25 (47)	2.12 (10)
Conduct Problems	2.08 (47)	2.10 (10)

3.11. Conclusions

The results of the data analyses show that modifying maternal negative EE is associated with a reduction in child hyperactivity and also in comorbid conduct problems. The data describe a relationship between child disruptive behaviour (hyperactivity and conduct problems) and maternal negative EE. Intervention was associated with reductions in maternal negative EE and child disruptive behaviour. The findings of the study and their implications together with the limitations of the study will be discussed in the following section.

CHAPTER 4 DISCUSSION

4.1 Introduction

The hypothesis of this study was that childhood hyperactivity is mediated by maternal Expressed Emotion (EE). The aims of the research were to examine the relationship between maternal EE and hyperactivity disorders in preschool age children and in particular to examine the effect of an intervention programme designed to modify maternal (EE) on child outcome. The study addresses the lack of information relating to the role of EE in childhood behavioural disorders and in addition and uniquely it examines the effect of an intervention designed to modify maternal EE. The nature of the study and the characteristics of the sample will be discussed in this section together with the results in relation to the research aims and with reference to existing knowledge of hyperactivity disorders and EE. The limitations of the study will be reviewed together with the implications for service provision and directions for future research.

In addressing the study aims it has been necessary to examine the complex issues which surround the phenomenon of hyperactivity in the preschool period. Hyperactivity continues to be controversial in terms of its diagnosis and management and it is perhaps at its most controversial in the preschool period. Hyperactivity is currently conceptualised as a neurodevelopmental disorder with onset early in life and whilst it has been the subject of extensive research, comparatively little is known about the early developmental precursors and presentation of the disorder. The preschool period represents a time of rapid development including, and of particular relevance to hyperactivity, the development of higher order cognitive function and self-regulation. Thus the origins of disordered self-regulation and hyperactivity lie in the preschool years. It would therefore seem appropriate for these years to be a focus for research, to examine the relative contribution of biological and environmental factors in the development and expression of the disorder. Instead,

relatively little of the substantial body of research into hyperactivity addresses the preschool period. The reasons for this are multiple and will be explored.

4.2 Characteristics of the study

4.2.1 Study design

This was a pragmatic, longitudinal, clinical intervention study with a waiting list control. The design was chosen after giving careful consideration to the research hypothesis and research questions together with practical and ethical issues.

The recognised gold standard for evaluating an intervention is the randomised controlled trial (RCT) (Treasure and MacRae, 1998) which provides definitive evidence that an intervention is effective. Such studies are increasingly used in psychiatric research. However, the design of most RCT's incorporating restrictive inclusion and exclusion criteria and intensive intervention protocols is such that the results often cannot be replicated in day to day clinical practice. More recently the concept of "pragmatic" RCT's has become increasingly popular where trials attempt to reproduce the real clinical situation such that results can be generalised to as wide a population as possible. Subjects are recruited from an heterogeneous population with few inclusion and exclusion criteria whilst the intervention is one which would be feasible in the clinical setting. Where the phenomenon under investigation is not fully understood, there is a growing acceptance of the appropriateness of using methods other than the RCT in evaluation (Caramazza, 1986).

The widely reported Multisite Multimodal Treatment study of Children with Attention Deficit Hyperactivity Disorder (ADHD) (MTA) (Arnold et al, 1997) is an example of a rigorously designed research protocol which would be difficult to reproduce in clinical practice. The MTA study was a large scale multi-centre project with impressive resourcing. The study compared the effectiveness of three active treatment arms to usual community

based clinic treatment which served as an "active control". The three active treatment arms of the study were strictly operationalised and represented significantly different treatment to usual clinical practice. Thus the pharmacological arm involved prescribed titration and monthly monitoring. The psychosocial intervention arm was intensive including parent and child programmes, regular telephone contact with school staff and a worker supporting the child in the classroom setting. Such intervention would not easily be replicated in normal day to day clinical practice and therefore the applicability of the findings to the real world is questionable.

The primary objective of the present study was to examine the effect on outcome of preschool hyperactivity of a purpose designed intervention aimed at modifying maternal EE. To date this has not been examined and reported in the research literature. The most appropriate study therefore was a before and after intervention design. A waiting list control group was included to ensure that any observed changes did not occur spontaneously but instead were associated with the intervention programme. This study design does not however allow attribution of causality nor does it identify which elements of the intervention programme are effective in terms of eliciting change. Should the study hypothesis be proven then a further more extensive study of a randomised controlled design might appropriately examine the relative contribution of various aspects of the intervention.

4.2.2 Controls

An important design consideration relates to the use of placebo control in intervention studies. Whilst the use of placebo establishes that it is the active treatment which confers benefit there are a number of challenges, both ethical and practical, associated with the use of placebo controls. In the first instance is it ethical to insist on a placebo arm when there are in existence established effective treatments? It can be argued however that it would

be unethical to subject patients to an intervention which has not been rigorously evaluated against a placebo. The second challenge relates to what constitutes a placebo for a psychosocial intervention. Various strategies are used such as usual clinic treatment, and modified, less intensive forms of intervention including brief counselling or the provision of written materials.

In the study reported here the primary objective was to control for spontaneous change in maternal EE and child emotional and behavioural adjustment. The reality of the clinical setting of the study meant that undoubtedly at some point children would have to wait for treatment and thus it would be possible to employ a waiting list control. In this way a control group would be available without patients being disenfranchised. An alternative of "usual clinic treatment" as a control condition was considered but the time constraints of the study and the location of usual treatment in several different child development centres meant that this was impractical. In addition there was no existing standardised usual clinic treatment with each clinic providing different interventions.

Thus whilst the gold standard for demonstrating the effectiveness of an intervention is the RCT the state of existing knowledge about EE in hyperactivity and its role in management together with the practical limitations described meant that such a design was not appropriate. Instead a controlled intervention study was designed such that the effect of the intervention programme on maternal EE could be assessed.

4.2.3 Sampling strategy

A clinical sample was chosen for this study. Children were selected from those referred to a specialist hyperactivity clinic and treatment programme. This represented opportunistic sampling. An alternative sampling strategy would have been to screen children in the general population and select those who presented with a range of severity of

hyperactivity. In view of the preliminary nature of this study and the intensive nature of the intervention programme, the selection of a clinical sample, referred because of concerns about hyperactivity, was most appropriate. This sampling strategy was further supported by the limitations imposed by the duration of the study and the number of subjects who could be included. Thus the study had to be completed within three years which represented the period of funding for the Fulton McKay Nurse (FMN).

Children were recruited sequentially from referrals to the clinic. The numbers of children referred to child psychiatry because of concerns about hyperactivity in the preschool period are relatively small compared to the numbers of school age children. As described in the Methods section, liaison with child development clinics (CDC's) and the promotion of early identification of children with hyperactivity was an important component of the recruitment strategy, leading to referrals from community paediatricians and community based clinical psychologists.

The choice of a clinical sample means that the results of the study cannot be applied to the general population. If the hypothesis is proven in the clinical population it would be important to extend the research to a general population sample and examine the extent to which EE is important in the expression and maintenance of the behavioural traits of hyperactivity and sub-clinical disorder in the general population.

4.2.4 Inclusion/exclusion criteria

As discussed in the section on study design, a pragmatic approach was adopted and therefore the aim of the sampling strategy was to be as inclusive as possible such that the children would resemble as closely as possible those seen in day to day clinical practice. Thus very few specific inclusion and exclusion criteria were employed. Those that were

defined the nature of the child's presentation (developmentally inappropriate levels of motor overactivity, inattention and impulsivity) age range of the children, that they were looked after by their mother or a permanent mother figure, that they did not have major neurological disease and that they had not received psychotropic medication within the last six months.

The presence hyperactivity was determined by a diagnostic clinical interview on the basis of which children who presented with the features of hyperactivity were invited to take part in the study. Thereafter the extent of their behavioural presentation was determined by the PACS interview. Specific cut off points were not utilised in order that the sample might reflect the spectrum of hyperactivity. An alternative would have been to utilise a screening questionnaire with a predetermined cut off. On balance it was felt that the diagnostic interview, which involved detailed description of the child's behavioural presentation according to research diagnostic criteria, was the most reliable way of identifying the target clinical sample.

4.2.4.1 Age

This study was designed specifically to examine the role of early intervention in hyperactivity disorders. The age range of three to five years was determined by the theoretical basis of the study which relates to the role of maternal EE in the development and maintenance of self-regulation and hyperactivity and the role of intervention in modifying this process. Thus the age group was selected from a developmental perspective to target children in the early stages of disorder, who could be engaged in intervention.

The aim was that children would not have started school at the time of their inclusion in the Programme to avoid disrupting their education and also because it was felt that children who had started school might be seen as different from other children still at nursery. In

fact two children had started school but this did not prove to be a problem in terms of their integration into the group. It did mean that they were absent from school for one day per week for the ten week intervention programme. In all cases this was negotiated with school staff who invariably viewed participation in the Programme to be in the child's best interests. This was seen as a reflection of the level of difficulty being experienced by the children in question.

Most of the children included in the Programme were attending nursery and so similar arguments could be put forward in terms of the disruption to these placements. Again, this was discussed in detail with the family and with nursery staff who were, in the main, supportive. Indeed on several occasions it proved possible to include a member of staff from the child's nursery in the therapist's training such that the nursery was also involved in the child's management. In all cases this was seen as positive by the mothers who were reassured that nursery staff were taking their concerns about their child seriously and were actively taking steps to address the child's needs in the nursery setting.

4.2.4.2 Comorbidity

Children were not excluded from the Programme if they demonstrated evidence of other disruptive behavioural problems in view of the frequency of such comorbidities. Thus Lavigne et al (1996) in their epidemiological study of the prevalence of psychopathology in young children demonstrated that all the children with ADHD had comorbid Oppositional Defiant Disorder (ODD). Children who presented with other established major psychiatric diagnoses (e.g. autism) were however excluded

4.2.4.3 Child's care placement

The main exclusion criteria related to the child's care arrangements whereby children who were not in the care of their mother or a permanent mother substitute were excluded. This was in view of the study hypothesis which addresses mother-child interaction.

4.2.4.4 Prior treatment with psychostimulants

Children were also excluded if they had been treated within the preceding six months with psychotropic medication in view of the evidence that treatment with, in particular, psychostimulants is associated with improvements in the quality of mother-child interaction (Barkley, 1989). In fact, reflecting current practice in the United Kingdom (UK), none of the children referred to the Programme had received treatment with psychostimulants.

4.2.5 Sample size

No study to date has addressed the effect of intervention on maternal EE in terms of the effect of this on child hyperactivity therefore it was not possible to undertake power calculations specifically in relation to this. The numbers of children required for the study were therefore determined by practical issues and evidence from studies of the treatment of hyperactivity generally.

This was a clinic based study and the aim was to recruit as many children as possible to the Programme over the course of the study period (three years). Although there is no data relating to the effect of intervention on EE in hyperactivity, studies have examined the effect of treatment on ADHD and it was therefore possible to make some estimate of sample size on the basis of this information. Thus studies of the treatment of ADHD are required to demonstrate clinical effect sizes equivalent to those seen in treatment with psychostimulants (effect sizes of 0.7 to 1.3) (Swanson et al, 1993). Using information from

previous studies of parent training at least 20 mother-child pairs would be required in order to show an effect of intervention (Sonuga-Barke, Daley, Thompson, Laver-Bradbury and Weeks, 2001).

This study involved review at three time points and again based on previous studies it was estimated that 10% of the sample might be lost at each follow-up. It was estimated that four treatment groups could be run per year with five mother-child pairs per group. Thus in total 60 mother-child pairs could be included in the study. Taking into consideration potential dropouts at review, it was estimated that this would be sufficient to demonstrate an effect at the one year follow-up. In the end 50 mother-child pairs were recruited to the treatment arm of the study.

4.2.6 Number of controls

Controls were selected from the waiting list for the intervention programme. As described above the aim was to control for the possibility of spontaneous change in the outcome measures over a period of time equivalent to the duration of the intervention programme. Because referral of this age group to the clinic was slow to establish and fluctuated, it was not until towards the end of the study period that a waiting list developed and therefore relatively few controls were recruited. Controls were included in intervention programmes immediately on completion of their review period. As these programmes took place after the completion of the study period, these data were not included in the analysis of the intervention reported in this thesis.

In total 13 control mother-child pairs were recruited and assessed at Time 1 (baseline) and re-assessed 10 weeks later (Time 5). Five mother child pairs failed to attend for all

components of the Time 5 assessment. This might be considered to be a limitation of the study and will be discussed later in this section.

4.2.7 Outcome measures

The outcome measures selected for this study were chosen to examine the effect of the intervention programme on the key variables of child emotional and behavioural adjustment, maternal EE and mother-child interaction.

4.2.7.1 Child psychopathology

Parental Account of Childhood Symptoms

Information about child symptoms can be systematically recorded in a number of ways, the respondent based interview (RBI) the symptom questionnaire, the interviewer based interview (IBI) and the clinician rating scale. RBI's are highly structured instruments with precise scripts of carefully worded and ordered questions which are read as written. The answers to these questions are restricted to a few clearly defined responses. The responses to questions are used to determine whether further detailed questions in a symptom area are asked. This information in turn is used to determine whether the reported symptom is clinically significant. These instruments are detailed and as such must be negotiated by a trained interviewer or by a computer programme.

IBI's are less structured and the interviewer has more influence and flexibility in the administration of the questions. Thus the interviewer can alter the order and wording of questions as appropriate. Similarly respondents are not restricted in their answers such that fuller descriptions of symptoms can be given and the interviewer, using their clinical knowledge, can interpret the answer and rate it accordingly.

Clinician completed rating scales are checklists which may be used to systematically record a clinicians opinion following a clinical assessment. However these instruments provide no detail as to how the information was collected or interpreted. Symptom questionnaires resemble RBI's in that they consist of lists of predefined questions with limited responses. Because of their simplicity they do not require direction from an interviewer and are usually self-administered.

A range of interviews are available for examining child psychopathology. The Diagnostic Interview Schedule for Children (DISC) (Costello, Edelbrock, Dulcan, Kalas and Klaric, 1984) is probably the most extensively used RBI. Examples of IBI's include the Diagnostic Interview Schedule for Children and Adolescents (DICA) (Ezpelata et al, 1997) and the Schedule of Affective Disorders and Schizophrenia for School-Age Children (K-SADS) (Puig-Antich and Chambers 1978). The interviews listed above explore the range of psychopathology in considerable detail, are lengthy and therefore time consuming in their administration. In the main they have been developed for the assessment of school age children and their use in the preschool population is limited.

Each method of assessment is subject to a range of limitations and inadequacies. The focus of this study was maternal perception of their child's behaviour and the affective content of the mother-child relationship. Thus an instrument which elicits information about childhood hyperactivity and associated problems based on maternal account was required. Ideally this instrument should be applicable to the preschool population. The Parental Account of Childhood Symptoms (PACS) (Taylor, Schachar, Thorley and Wieselberg, 1986) was selected in view of the fact that it was developed as a measure of children's behaviour as described by their parents in order to distinguish between hyperactivity and conduct problems. In addition it has been used in the preschool population (Sonuga-Barke, Daley, Thompson Laver-Bradbury and Weeks, 2001).

PACS has been shown to have good inter-rater and test-retest agreement. In this study inter-rater agreement was found to be very good (Altman, 1999). The PACS provides more detailed information than parent report questionnaires. It addresses the known biases of parental report such as the effect of parental interpretation of behaviour and varying standards of what is perceived to be acceptable. The rating is based on a trained interviewer asking a series of questions about behaviours. Parents are asked to recall details of behaviour in different settings. The interviewer then makes judgements about the frequency and severity of the behaviour problems described. In this way the instrument is reliable in eliciting levels of disturbance. Separate scales are available for emotional problems, hyperactivity and conduct problems and these have been shown to be factorially distinct and in this way PACS provides a broad assessment of child mental health. Nevertheless the scale relies on parental report and this source of potential bias can never be entirely removed.

A possible weakness of the study relates to the fact that the information about the children's behavioural adjustment came primarily from the mothers. Some information was derived from nursery staff by means of self-complete questionnaires (see below) but this information was less reliable in view of the fact that the data was not complete. A further study should be more comprehensive in terms of collecting information from other sources including other family members. In addition more detailed information from nursery could be obtained by interviewing nursery staff, either as part of a nursery visit or by telephone.

Questions from the Present State Examination about maternal depression were also included at the end of the PACS interview. These questions were included in view of the evidence for the role of maternal depression in the development of hyperactivity. In

retrospect a more in depth examination of maternal mental health may have been appropriate especially in relation to ADHD in view of recent findings which suggest that mothers affected by ADHD have more difficulty using parenting interventions (Sonuga-Barke, Daly, Thompson, Laver-Bradbury and Weeks, 2001).

Self-complete questionnaires

The Behaviour Checklist (BCL) (Richman, 1977) and the Preschool Behaviour Checklist (PBCL) (McGuire and Richman, 1986) were chosen for this study. Both have been widely used in studies of UK populations and have been shown to be useful screening instruments. Possible criticisms would include the BCL being less sensitive in detecting mild disorders. It can be expected to identify 85% of mild to severe cases as compared to the Behaviour Screening Questionnaire (BSQ) from which it is derived (Richman 1977). It is therefore useful as an epidemiological instrument in distinguishing between two populations, or as a screening instrument to be used by health care professionals in identifying children at risk of a behavioural disorder. This is perhaps less relevant to this study where in general the children were presenting with more severe disorder.

The PBCL was used in an attempt to obtain an independent rating of the child's psychopathology from nursery staff. The method used to obtain nursery ratings involved giving the questionnaire to the mothers who in turn were asked to request that relevant nursery staff complete the scale. Nursery staff returned questionnaires to the mothers who in turn returned them to the clinic. This method was approved by the ethics committee, permission to pursue questionnaires which were not returned was not obtained. This in retrospect was a design flaw in view of the low return of questionnaires particularly in the later stages of review. Similarly the rate of completion of the BCL by mothers was poor which was due to the fact that they were allowed to take the questionnaires away with them

and return them in a stamped addressed envelope. In retrospect improved completion rates would have been achieved by asking the mothers to complete questionnaires before they left the clinic and by the researcher contacting the nursery directly. In further studies more rigorous methods for ensuring the return of questionnaires should be employed.

4.2.7.2 Emotional climate between mother and child

Expressed Emotion

Expressed Emotion (EE) was a key outcome measure. The Camberwell Family Interview (CFI) (Leff & Vaughn 1985) has been extensively used and is considered to be the gold standard for the assessment of EE in family members. It is a semi-structured interview which elicits from the relative a description of the patient's illness, the nature of their symptoms, problems experienced by the family in coping with the patient and details of the interpersonal relationship between the respondent and the patient. The interview is audio-taped and coded on a series of dimensions relating to EE namely critical attitudes, hostile attitudes and extreme emotional over-involvement (EOI). High rates of criticism and EOI are predictive of relapse in schizophrenia and other disorders. A relative is classified as high EE if they either express a high level of criticism or EOI.

The CFI is lengthy, at times taking four to five hours to complete. Thus it is unwieldy and impractical. Vaughn and Leff (1976) demonstrated that most criticisms are made during the first hour of the CFI and they therefore developed an abbreviated version requiring one to two hours to administer and this has subsequently been used extensively in research. Nevertheless, the abbreviated CFI still requires considerable investment of time, taking three to five hours to administer and score. In view of this and in light of the need for a more convenient instrument to measure EE, Magna, Goldstein, Karno, Miklowitz and Falloon (1986) developed the Five Minute Speech Sample (FMSS), derived from the CFI.

It has the advantage of being short and easy to use, taking five minutes to administer and 10-20 minutes to score. It's reliability has been established (Malla, Kazarian, Barnes and Cole, 1991) and it has been widely used in the assessment of the role of EE in the nature and course of child psychopathology (Stubbe, Zahner, Goldstein and Leckman, 1993, Hibbs et al, 1991).

The EE assessment used in this study was developed as part of the Institute of Psychiatry Assessment of Adversity (Quinton and Rutter, 1976, Rutter and Quinton, 1984). It was developed from the measures described above and has been used elsewhere, most notably incorporated in PACS (Taylor, Schachar, Thorley and Wieselberg, 1991) and the Psychosocial Assessment of Childhood Experiences (PACE) (Sandberg et al 1993, Sandberg, Rutter, Pickles, McGuiness and Angold, 2001). It has been shown to be a reliable and valid measure of EE which is easy and convenient to administer thus overcoming many of the practical limitations of the CFI. The system of rating clearly defines criteria for criticism and warmth. The measure includes overall ratings of the levels of criticism and warmth together with counts of the overall numbers of critical and warm remarks. The potential for rater bias is minimised by the operationalisation of criteria and rater training. Inter-rater reliabilities achieved in this study ranged from good to very good (Altman, 1999).

The measurement of EE was limited in view of the fact that the rating was based on maternal EE and did not therefore completely describe the child's whole EE environment. The measurement of maternal EE alone was however appropriate in view of the study hypothesis.

Whilst the measure of EE used in this study is well established it remains a crude instrument in terms of assessing the subtleties of parent-child affective communication in

that it provides only a quantitative evaluation of warmth and criticism. The experience of conducting the interviews with the mothers and reviewing the videotapes highlighted for the researcher the complexities of EE. During the course of the interviews various themes emerged relating to maternal guilt and worries about their child's behavioural problems. Such emotions may be important in determining the quality of maternal EE. The complexity of such emotional expression is not captured by the measures used in this study and future studies should address the detailed assessment of the EE environment in the child's home. This is discussed later in this section.

Mother-child interaction

A vast range of coding systems are in existence for the assessment of mother-child interaction. These address various aspects of the behaviour of both the mother and the child and the interaction between them. Many of the rating systems applied to studies of childhood hyperactivity draw upon the Response Class Matrix developed by Mash, Terdal and Anderson (1979). This and the systems derived from it code dyadic interaction in which specific classes of mother-initiated behaviour are coded together with the child's response and specific classes of child-initiated behaviour are coded together with the mother's response. Such systems of are subject to the limitations which affect all observational measures; that is they are open to the subjective interpretations of the raters.

Observations can be carried out in the clinic or laboratory setting, at home or in some other environment such as school or nursery. There are limitations associated with observations carried out in any of these settings. Clearly the laboratory or clinic is an artificial setting which may affect the behaviour of both mother and child. Equally an observer entering the home environment, school or nursery immediately changes that environment. This issue has been addressed by a number of authors. In particular Barkley (1991) has discussed the limitations of observational systems in the assessment of hyperactive children and mother-

child interaction. He concluded that such measures are of limited clinical use but that they do however have a place in research. In addition Barkley emphasised an important point which is that many of the variables of interest do not readily translate into easily codeable categories. Thus he identified an important limitation of coding systems, their inadequacy in capturing the complexity of human interaction.

The coding system for the Mellow Parenting Programme (Puckering, Rogers, Mills, Cox and Mattson-Graff, 1994) was chosen for this study. This system is extensive (see the Methods section of this thesis) examining 6 dimensions of parenting (anticipation, autonomy, warmth and stimulation (responsivity), co-operation, distress and control and conflict). In addition both mother and child affect can be coded throughout. It was originally designed to be used during care taking interaction between mother and child observed in the home however, the versatility of the coding system has been demonstrated in that it has been used to evaluate mother-child interaction in other settings. Also other authors have selected and used components of the coding system rather than the whole (Lambrenos, Weindling, Calam and Cox, 1992).

In this research mother-child interaction was rated during structured and unstructured task situations in the clinic. In view of the fact that the coding system yields vast amounts of data not all of which was directly relevant to the study it was appropriate to focus on the maternal affect codes. The rating system is highly complex and relies on the observer's judgement which, by its very nature, is subjective. The potential for bias is again addressed by training and a detailed coding manual which operationalises the ratings. Inter-rater reliabilities in this study ranged from good to very good (Altman, 1999).

The limitations of laboratory based observational ratings (Barkley, 1991) discussed above apply to this measure. In particular the rating of maternal affective expression towards their child may have been influenced by the context of the assessment in this study. The clinic was an artificial environment for the mothers and children who were also aware that they were being observed and videotaped. Whilst the mothers were encouraged to interact and play with their children as they would at home, it is likely that the setting and the fact that they were being observed influenced their behaviour towards their children.

Whilst the Mellow-Parenting coding system is an established and validated measure of mother-child interaction and was chosen to avoid the complications of developing a measure specifically for the study, it may have failed to adequately capture the complexity of affective expression between mother and child. It may be necessary in future studies to combine different methods, qualitative and quantitative, in order to adequately describe the complexity of EE between mothers and their children and in particular to describe the interactive, bidirectional aspects.

4.2.7.3 Maternal depression

In view of the association between maternal depression and child disruptive behavioural problems it was appropriate to incorporate an outcome measure which assessed this. For this purpose questions from the Present State Examination (Wing, 1974) were employed and included at the end of the PACS interview. This is a well established instrument with proven reliability and validity and provided a convenient measure of maternal depression.

The presence of other maternal psychopathology was not systematically examined. The heritability of hyperactivity is clearly established and therefore it is possible that some of the mothers of children included in this study will have been affected by the disorder. The fact that formal assessment of this was not undertaken may be considered as a potential

limitation. As described later in this section it was the clinical impression of the researcher that a number of the mothers participating in the study showed signs of the disorder.

4.3 Characteristics of the sample

As described and in the Results section, subjects were recruited from a clinic specialising in the treatment of hyperactivity disorders, based in the Royal Hospital for Sick Children in Glasgow. Children were referred to the clinic by other child psychiatrists, paediatricians and primary care workers, especially general practitioners and health visitors. In this respect the subjects cannot be considered to be representative of children with hyperactivity disorders in the general population, although it is likely that they are representative of clinic populations.

4.3.1 Socio-demographic characteristics

4.3.1.1 Age

Children (subjects and controls) were aged between three and five years at the time of their baseline assessment (Time 1). The reasons for targeting the preschool period are discussed earlier and again later in the General Discussion section. One child has passed his fifth birthday at the time of entering the programme but had been delayed from entering school due to concerns about his behaviour.

4.3.1.2 Gender

More males than females were referred to this study. The male: female ratio overall (including subjects and controls) was 6 to 1, amongst subjects, 5 to 1 and amongst controls, 12 to 1. The literature consistently reports that hyperactivity disorders are more common in males than females with ratios ranging from 3 to 1 to 9 to 1 (Gaub and Carlson, 1997). The gender ratio reported in other preschool intervention studies varies. Thus Sonuga-Barke, Daley, Thompson Laver-Bradbury and Weeks (2001) reported a ratio of approximately 2

to 1 males to females compared to 4 to 1 reported by Pisterman et al (1989). In general these variations reflect differences in study design. Sonuga-Barke, et al used a two stage design involving screening a general population sample followed by detailed assessment of cases above a predetermined cut off point. The present study and that of Pisterman et al draw on clinic referred samples. In such studies the male: female ratio is thought by some authors to represent referral bias related to the disruptive aspects of the disorder. Thus boys seem to have more of the hyperactive/impulsive and oppositional/conduct symptoms than girls and such behaviour is more likely to precipitate referral to psychiatric services (Heptinstall and Taylor, 2002). Thus whilst there were differences between the subjects and controls in terms of the gender ratio, overall the ratio was representative of that encountered in clinical studies.

4.3.1.3 Socio-economic status

The majority of the study population lived in deprived areas (70% of subjects lived in areas categorised as Deprivation Category (DepCat) 4-7). Again this finding is in keeping with existing evidence which suggests that in western countries, referrals to child and adolescent mental health services show a preponderance of families of lower socio-economic status (Garralda and Bailey, 1988).

The relationship between hyperactivity and low socio-economic status (SES) has not been conclusively determined. Thus Merrell (1990) reported that whilst low SES was associated with aggressive behaviour in children it is not associated with the core symptoms of inattention and hyperactivity. Other authors have confirmed that deprivation is associated with mental distress in children in general (Radal, Milgrom, Cauce and Manci, 1994) and with antisocial behaviour but not specifically with hyperactivity (Taylor, Schachar, Thorley and Wieselberg, 1986). Campbell, Ewing, Breaux and Szumowski (1986) reported that SES contributed to the prediction of childhood activity and aggression at age two to

three years, whilst at age six, SES continued to contribute to the prediction of hyperactivity but not aggression.

Other authors have addressed the influence of SES from a developmental perspective and it is clear that the relationship between environmental and biological risk is complex. Sameroff and Chandler (1975) propose a model of "care-taking causality" in which a positive environment enhances children's resilience. Whilst SES is not consistently related to the quality of the home environment, children living in conditions of overcrowded, noisy homes generally perform less well on cognitive tasks than children living in less crowded conditions (Gottfried and Gottfried, 1984). The further exploration of the role of SES in hyperactivity was beyond the remit of this study.

4.3.1.4 Family factors

The literature describes an association between a range of family factors and childhood behavioural disturbance including hyperactivity. These include parental mental illness, typically maternal depression, paternal alcohol abuse and antisocial behaviour, family instability (family break-up, frequent moves and change of school) and marital discord (Gillberg and Rasmussen, 1982; Hartsough and Lambert, 1982). The presence of these factors was examined in this study. These psychosocial correlates are primarily factors which characterise the family environment, exerting an influence on the child or children growing up in that environment. The factors of most significance in this study population were maternal low mood and marital discord.

Family disruption

The children who took part in this study were in most cases looked after by both biological parents (more than half of the subjects and nearly half of the controls) and in no case had

the child been separated from their mother for a period of over a month. Nor were the families characterised by frequent moves of house. In this respect the sample was relatively stable compared to those reported in other research. An important finding however was that of reported marital discord with significant levels being described by the mothers.

These findings in relation to family disruption may in part be explained by the age of the subjects, thus it is possible that these are families who may well suffer disruption and parental separation in years to come. Certainly the high levels of discord suggested that many parental relationships were under strain and that they might be vulnerable in the future. During the course of the Programme and the review period three families were known to have been disrupted by parental separation.

Family History

Histories of behavioural disturbance or learning difficulties as children were reported by very few of the parents in this study. Similarly histories of paternal alcohol abuse and imprisonment were uncommon. The literature suggests that mental illness in a parent is a risk factor for psychological disturbance in the child although this effect is in general non-specific (Rutter and Quinton, 1984) and studies examining its role in hyperactivity are inconclusive (Taylor, Sandberg, Thorley and Giles, 1991).

It is now well established that hyperactivity runs in families (Stevenson, 1992) and therefore some of the parents of hyperactive children will themselves be affected by the disorder. There is a developing literature on the management of adults with hyperactivity (Wender, 1998) although it continues to go unidentified and untreated in the majority of cases in the UK. Having a hyperactive parent and particularly in the preschool period a hyperactive mother, may further compromise the child's overall care-giving environment

and the effectiveness of treatment (Sonuga- Barke, Daley, Thompson, Laver-Bradbury and Weeks, 2001). The mothers in this study were not formally assessed for hyperactivity however clinical impressions suggested that several of the mothers showed hyperactive traits.

Maternal depression

Low mood was reported by around half of the mothers in this study who described moderate to severe depression at the time of their first assessment (Time 1). However few had been treated by their general practitioner or by a psychiatrist. There is evidence that maternal depression can be persistent and may begin early in the child's life. The influence of maternal low mood on child development may be significant and important in terms of the development of hyperactivity disorders via the influence on the development of self-regulation. The importance of the quality of caregiver-infant interaction in the development of child self-regulation (and the emergence of basic attentional, motivational and problem solving skills) and the cognitive schemata which mediate these executive functions (EF) has been described. Cox, Puckering, Pound and Mills (1987) demonstrated that depressed mothers respond inconsistently to their children. Thus maternal depression may be a risk factor for the development of hyperactivity disorders via the effect on the mother's capacity to facilitate the development of self-regulation and EF.

Previous research has established the high correlation between maternal depression and marital discord (Cox, Puckering, Pound and Mills 1987). In addition, some studies have shown an association between conflictual relationships between parents and childhood hyperactivity, although in most cases the research has not adequately distinguished between children suffering from hyperactivity, conduct disorder or the combination of the two disorders. Taylor, Sandberg, Thorley and Giles (1991) did make this distinction and found that in fact hyperactive children were less likely to come from families characterised

by marital discord than were children with hyperactivity and conduct problems. Marital discord is likely to exert its influence through qualitatively altered parent-child interactions. In this study marital discord characterised the relationships of around half of the mothers overall.

4.3.1.5 Child factors

Comorbidity

A range of other childhood psychiatric problems and developmental delays are reported to be comorbid with hyperactivity. Most common are the presence of other disruptive behavioural disorders such as Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) and developmental language delays. The presence of comorbid emotional and behavioural difficulties in this study is discussed in the section of this chapter on emotional and behavioural adjustment.

The levels of language delay identified in this study are in keeping with those reported in the existing literature (Purvis and Tannock, 1997). Thus around half of the study participants overall were reported by their mothers to have had delay in their language development and many had been seen by a speech and language therapist. This is seen as further support for the conceptualisation of hyperactivity as a neurodevelopmental disorder.

Nursery placement

The majority of children in the study were attending nursery at least on a part time basis. In many cases mothers believed that their children presented with behavioural difficulties in nursery and around half were concerned about their child's learning. A nursery placement can be seen as a potentially beneficial experience for children with behavioural difficulties in that it may provide the opportunity for early behavioural intervention. Drawing on the

theoretical perspective that hyperactivity represents a delay in the acquisition of age appropriate self-regulation, the structure and supervision experienced in nursery school may facilitate the development of control in borderline hyperactive children. This may be particularly important for those children who live in over-crowded and disorganised homes which do not support the development of self-regulation.

Overall the sample of this study is representative of those described in other research examining clinical populations of preschool children presenting with behavioural problems. The children were characterised by high levels of conduct problems in addition to hyperactivity. The known psychosocial correlates of these behavioural problems were present and the sample was therefore representative of previous research.

4.4 Main outcome measures at Time 1

4.4.1 Emotional and behavioural adjustment

High levels of behavioural disturbance (hyperactivity and conduct problems) but low levels of emotional problems as measured by the PACS were observed in this study.

4.4.1.1 Emotional problems

Relatively low levels of emotional problems were found in the subjects of this study. This is in keeping with the results reported by Taylor, Sandberg, Thorley and Giles (1991) from the Newham study. The Newham study involved the screening of a general population sample followed by detailed assessment of children (boys) who scored above the cut of for hyperactivity and or conduct problems. The levels of emotional problems found in the second phase of the Newham study were similar to those found in the present study. The other preschool intervention studies mentioned previously did not discuss in detail the emotional adjustment of their subjects (Sonuga-Barke, Daley, Thompson Laver-Bradbury and Weeks et al, 2001).

Higher levels of emotional disturbance might have been expected in this sample in view of the fact that other clinic based studies have reported levels of comorbid emotional disorder of 25% (Jensen, Martin and Cantwell, 1997). However, most of these studies have examined school age children and there are therefore important developmental considerations. There are a limited number of studies examining the prevalence of psychiatric disorders in the preschool population and these have described rates of less than 1% for emotional disorders (Lavigne et al 1996).

This study relied on parental report of child symptoms and there is evidence that parents are less reliable at identifying their children's emotional difficulties than their behavioural difficulties (Faraone, Biederman and Millberger, 1995). The same evidence supports the fact that children are more reliable at reporting their own internalising symptoms. These findings relate to the school age population and there are practical difficulties associated with eliciting evidence of emotional problems directly from preschool age children. Thus whilst there is evidence from studies of older children of increased rates of emotional problems amongst those with hyperactivity disorders it is difficult to elicit this information in the preschool period.

Studies of older children with hyperactivity have also described low self-esteem (Anderson, Williams, McGee and Silva, 1989). Whilst data on the self-esteem of the children in the present study were not collected directly, observations were made by therapists during the course of the Programme in respect of the children's self-concept. In particular the weekly diary time session was informative in that therapists noted that some children found it difficult to hear the positive comments that had been recorded about them on previous weeks and some destroyed their pictures and stickers when these were praised.

4.4.1.2 Hyperactivity

The high levels of hyperactivity recorded in this study are in keeping with levels reported in other studies (Taylor, Sandberg, Thorley and Giles, 1991, Sonuga-Barke, Daley, Thompson Laver-Bradbury and Weeks et al, 2001). All the children referred to the Programme had been screened either by child and adolescent psychiatrists, paediatricians or general practitioners who suspected that the child might be suffering from a hyperactivity disorder. As a result the ratings of hyperactivity were not normally distributed but were skewed towards the higher end of the PACS rating. Thus the sample cannot be considered to be representative of hyperactivity in the general population.

4.4.1.3 Conduct problems

High rates of conduct problems were recorded amongst the study population; this is not unexpected. The combination of hyperactivity and conduct problems including oppositional defiance is very common and has been reported elsewhere in the literature (Jensen, Martin and Cantwell, 1997). Lavigne et al (1996) in their epidemiological study of prevalence of psychiatric disorders in preschool children found that ODD was by far the most common disorder occurring in 16.8% of the children they examined (aged two to five years). In addition they found that 2% of children met criteria for ADHD and that in all cases this was comorbid with ODD.

It can be seen that the sample selected for this study is similar to other clinical samples of children with hyperactivity disorders in terms of the patterns of emotional and behavioural disturbance. Nevertheless the difficulties in examining emotional and behavioural adjustment in young children must be acknowledged.

4.4.2 Expressed Emotion

High levels of maternal expressed emotion (EE) were recorded in the ratings based on the whole interview (WI) and the part of the interview designed specifically to elicit EE (SPQ). In all cases this related to maternal criticism. Correspondingly low levels of expressed warmth were elicited. No statistically significant differences in the two ratings (WI and SPQ) were detected.

The literature on EE in adults describes three components: criticism, hostility and EOI. The literature examining EE in child emotional and behavioural disorders is not extensive but there are some consistent findings. Thus the hostility dimension of EE occurs rarely in relation to young children and whilst EOI has not been found to be associated with childhood behavioural disorders it has been noted in other childhood physical and psychological disorders. High levels of criticism have repeatedly been described in association with childhood behavioural problems (Vostanis, Nicholls and Harrington, 1994). There is however very little research specifically examining the role of EE in preschool hyperactivity. That which exists describes high levels of criticism (Baker, Heller and Henker, 2000). Thus the findings of the present study are in keeping with existing research.

This study evaluated maternal EE but did not examine paternal EE. Thus the nature and influence of paternal EE is unknown. Previous research however suggests that fathers of hyperactive children are also critical. Thus the Newham study (Taylor, Sandberg, Thorley and Giles, 1991) did examine paternal EE although the authors report that this data was less reliable than that obtained from mothers as it was based upon less complete and systematic interviewing. High levels of criticism were elicited from both mothers and fathers and the highest levels of criticism were found in children who presented with the combination of hyperactivity and conduct symptoms.

4.4.3 Mother-child interaction

Ratings of mother child interaction were based on observations of the mothers and children in a clinic setting. Observations were made under two different experimental conditions, one structured and one unstructured. In this study the objective was to examine levels of observable maternal EE and as described above the coding system for the Mellow Parenting Programme (Puckering, Rogers, Mills, Cox and Mattson-Graff, 1994) seemed ideal.

In general high levels of maternal positive interaction in both structured and unstructured play tasks were observed. The ratings of mother-child interaction revealed that even mothers who had scored highly for criticism on the EE rating behaved in a positive way towards their child in both structured and unstructured task settings. Similarly low levels of negative interaction were observed in both structured and unstructured settings. When the levels of positive and negative interaction were compared between the two task settings, statistically significant differences in levels of negative interaction between structured and unstructured tasks were found with mothers being more negative in the structured task setting. This is in keeping with existing research which has reported that mothers of hyperactive children are more critical, directing and controlling in structured task settings (Danforth, Barkley and Stokes 1991).

It had been expected on the basis of the high levels of critical EE elicited during interviews with mothers, that higher levels of negative affect would be seen in the clinic observation. The study findings that mothers were in fact mostly positive in their interaction with their children during the clinic observations may be explained by a number of factors including the nature of the measure and how it was applied. In particular the effect of the environment or setting on behaviour has been described and it is known that people behave

differently in different situations. Thus mothers may have behaved differently towards their child in the clinic setting knowing that they were being observed.

When the relationships between EE variables (warmth and criticism) and observed mother-child interaction (positive and negative) were examined the only significant finding was of an association between EE criticism and negative mother-child interaction in the structured play task. Thus whilst the observed levels of maternal criticism were lower than expected, the relationship between criticism and negative mother-child interaction in the structured task setting suggests that this task setting approximates to the child's usual EE environment and may therefore the most useful in terms of evaluation.

4.4.4 Controls

The primary purpose of the control group was to provide the opportunity for comparison with a non-intervention condition and to control for spontaneous change in mother child interaction and child behavioural ratings. The controls were few in number which limits the extent of possible comparisons. However controls were similar to subjects in terms of socio-demographic details and on key outcome measures at baseline.

There was a greater male: female ratio amongst the control group as compared to the subjects (12:1 compared to 5:1). It is likely that the ratios would have been similar had a larger control group been recruited in view of the fact that the controls were recruited from the same clinic population. More subjects were looked after by both biological parents than controls. Again this may be a feature of the relatively small number of controls. However when the numbers of children looked after by either their biological parents or their mothers and a father substitute were combined the groups were similar. In fact the control group more closely resemble other clinical samples than do the subjects, many of whom

have experienced family disruption as described above. It is perhaps important to note that much of the research describing family disruption involves older, school age children.

Controls were also similar to subjects in terms of the levels of maternal EE although there were significant differences in the observed levels of positive and negative mother-child interaction. Differences were observed between the ratings of negative mother-child interaction in both structured and unstructured settings where control mothers were found to be significantly more negative. Control mothers also showed significantly less warmth towards their children in the unstructured setting.

These differences are most likely explained by the low numbers of controls which limits the usefulness of comparisons between subjects and controls in general. Thus if an equal number of subjects and controls had been included in the study, levels of EE and mother-child interaction may have been the same in the two groups.

Overall the control group were similar to subjects with the exception of mother-child interaction.

4.5 Changes in main outcome measures post intervention

Outcome measures were repeated at three time points one month (Time 2), six months (Time 3) and twelve months (Time 4) post intervention for subjects and after ten weeks (Time 5) for controls. Significant reductions in maternal EE, negative mother child interaction and child behavioural disturbance were observed in subjects post intervention. These changes were maintained across the three time points and further improvement was observed in child hyperactivity. No significant improvements occurred in any outcome measures in the control group and significant increases in conduct problems and negative mother-child interaction in the unstructured task setting were observed at Time 5.

4.5.1 Emotional and behavioural adjustment

4.5.1.1 Emotional problems

No significant changes in levels of emotional problems were observed in the subjects at Time 2. However, it is interesting to note that significant changes in respect of a reduction occurred between Time 2 and Time 3 although this was not maintained at Time 4. This may be a reflection of overall improvement in the child's wellbeing accompanying the reductions in maternal negativity. Thus a cycle of positive reinforcement can be postulated in which reduction in maternal negativity is associated with reductions in child behavioural disturbance resulting in an improvement in the overall emotional climate between mother and child in turn leading to the child generally feeling happier. An alternative explanation is that the results were due to dropout of more severely affected individuals. The number of dropouts was however relatively small and in particular the amount of missing data for the PACS ratings was very low and was thought not to exert a significant influence on findings. In fact there were no statistically significant differences in mean PACS subscale scores at baseline between those who dropped out across the study and those who continued.

4.5.1.2 Hyperactivity

Statistically significant reductions in the levels of hyperactivity were recorded post intervention and these were maintained at all three time points i.e. up to one year following intervention. Other similar intervention studies have demonstrated maintenance of improvement over time although for shorter time periods (Sonuga-Barke, Daley, Thompson, Laver-Bradbury and Weeks, 2001). In fact further improvement in hyperactivity occurred between Time 2 and Time 3. Again it is unlikely that this was due to dropout of more severely affected children as discussed above.

The effect of the review sessions may have been important in maintaining and promoting further improvement. The review sessions were designed as booster sessions such that in addition to reviewing outcome measures, mothers had the opportunity to discuss any ongoing worries and difficulties. The indirect effect of ongoing contact with the clinic and therapists and the power of engagement and being supported by the clinic must also be considered. Thus the mothers knew that their child continued to be a patient of the clinic and that therapists could be contacted for advice if necessary. In fact very few contacts were made between review sessions. A further influence on the maintenance of effect may be the on-going development of the children. It is recognised that for some children the symptoms of hyperactivity lessen with increasing age. Thus for some of the children recruited to the study the improvement in their symptoms may be attributable to their further development of self-regulatory capacity.

4.5.1.3 Conduct problems

Significant reductions in the levels of conduct problems were observed at review and these reductions were maintained at one year follow-up. Unlike hyperactivity, no further improvements in conduct problems occurred over time. Possible explanations for the continued improvement of both hyperactivity and conduct symptoms are discussed in greater detail below.

4.5.1.4 Self-complete questionnaires

The BCL and PBCL were used in this study to further examine child emotional and behavioural adjustment. As described above response rates throughout the study were not good and this limited possible comparisons. A number of observations are however worthy of note. In particular, the levels of agreement between mothers and teachers in terms of rating the child's emotional and behavioural adjustment were poor. At baseline agreement was seen in less than half of the children and this did not improve over time. It is

interesting that when the mothers were asked about their child's presentation in nursery, around half believed that their child was not demonstrating behavioural problems in that setting.

These findings are in keeping with other studies which have in general shown that mothers report more hyperactivity and disruptive behavioural problems than teachers (Offord et al, 1996). Possible explanations include the fact that in general, nursery staff have a broader experience of children than individual mothers and will have experienced children who present with a range of behavioural disturbance. They may therefore be more tolerant of behavioural disturbance than mothers. The nursery environment may also be important in that for some children this may be containing and less challenging then their home. Children may therefore be less likely to come into conflict about their behaviour in the nursery. The discrepancy between maternal and nursery ratings leads to a debate about the usefulness of maternal ratings and traditionally maternal reports are considered to be unreliable and subjective. In fact evidence supports the fact that maternal ratings of child disruptive behaviour are predictive of later externalising problems (Olson, Bates and Bayles, 1989).

Following intervention there was a significant reduction in the number of children who were rated as scoring above the cut off on the BCL. No significant reduction occurred in relation to the PBCL. The findings in relation to the BCL are in keeping with the PACS scores for disruptive behaviour which were high at baseline and reduced significantly following intervention. The relationship between questionnaire scores, PACS scores and measures of the emotional climate between mother and child were explored statistically but the findings were mostly unremarkable. It is likely that these findings were influenced by the poor return of questionnaires and the factors discussed above.

4.5.2 Expressed Emotion

A statistically significant decrease in critical EE was observed at Time 2 accompanied by a significant increase in the levels of expressed warmth. This was mirrored by similar changes in the numbers of positive and critical remarks. Again these effects were maintained throughout the review period.

4.5.3 Mother-child interaction

The most consistent finding in terms of mother-child interaction was of a reduction in negative interaction in the structured task setting which was maintained across all review points. This was accompanied by a significant increase in positive interaction in the structured task setting as Time 2 which was maintained at Time 3 but not Time 4. Changes in levels of interaction in the unstructured task were less robust with a significant decrease in negative interaction and a significant increase in positive interaction occurring only at Time 3. In comparison, control mothers became significantly more negative in the structured task setting at Time 5.

The reduction in negative interaction in the structured setting is in keeping with other research which describes reductions in the levels of directive and controlling mother-child interaction in structured tasks following treatment, particularly with psychostimulants (Barkley, 1989). The results suggest that a qualitative change occurred in the mothers approach to their children and that this was the result of the intervention. Thus mothers were using their experiences of the Programme and were implementing the strategies they had learned in their interactions with their children.

In view of the significant changes observed in EE ratings, both warmth and criticism, following intervention, it might have been anticipated that more significant changes would have occurred in observed mother-child interaction. As discussed above, the baseline

observations of mother-child interaction were not as expected and the limitations of the measure, particularly the effect of the clinic setting may be important.

4.6 The relationship between Expressed Emotion and mother-child interaction

A significant relationship was observed at Time 1 between maternal criticism and negative mother child interaction in the structured task setting. Thereafter the relationship was no longer significant. A significant relationship was also observed between maternal warmth and positive mother-child interaction in the structured task setting at Time 2 and Time 4. These findings are not sufficiently robust to allow firm conclusions about the relationship between these two measures.

4.7 The effect of the Intervention - summary

The results of the analyses establish that the following intervention levels of maternal criticism were reduced and levels of warmth increased. These changes were accompanied by reductions in levels of child behavioural disturbance, both hyperactivity and conduct problems. No such changes were observed in the control group and therefore it is likely that the changes were as a result of the intervention programme.

Linear regression was employed in order to determine whether it would be possible to identify factors (maternal, child or general) which would predict response to treatment. This would clearly be useful clinically in view of the costly nature of the Programme both for the children and their families and also for the health service. The results of these analyses were unhelpful in that the only predictor appeared to be the level of hyperactivity at baseline. It is likely that the small numbers involved in this study prevented the identification of predictors and that a larger study might allow this.

4.8 The Role of maternal Expressed Emotion in mediating child behavioural disturbance

The data confirm a relationship between hyperactivity and conduct problems and maternal negative affect reflected in high levels of criticism and low levels of maternal warmth at baseline and maternal negativity in the structured task setting. Further statistical tests were employed to examine the relationship between EE and child behavioural adjustment and these established that the relationship between hyperactivity and maternal criticism persisted throughout the study, thus strengthening the evidence for an association. The same was true of the relationship between conduct problems and criticism. Similarly associations were demonstrated between low levels of maternal warmth and hyperactivity which were maintained at Time 3 but not Time 4 and conduct problems which were maintained throughout the study.

Further evidence for the role of EE in mediating child behavioural disturbance was elicited by examining the extent of change in maternal EE in relation to change in hyperactivity and conduct problems. Here it was found that mothers who achieved lower reductions in their levels of criticism and lower increases in their levels of warmth following intervention reported lower reductions in the levels of hyperactivity and conduct problems displayed by their children. These findings provide further evidence for a relationship between EE and child behavioural disturbance.

No relationship was observed between those aspects of maternal EE examined in this study (warmth and criticism) and child emotional problems. The literature describes a relationship between child internalising problems and maternal EOI which was not examined as part of this study.

Because comorbidity between hyperactivity and conduct problems was so common in this study, it was not possible to examine the differential effect of EE on these two aspects of child behavioural disturbance. The numbers of children presenting with hyperactivity without comorbid conduct disorder were too small to allow meaningful statistical investigation.

4.9 Summary

The present study has confirmed the relationship described in the literature between maternal negative EE and child disruptive behaviour, hyperactivity and conduct problems. It was not possible however to examine for any differences in the relationship between maternal EE and hyperactivity and conduct problems. It is clear that maternal EE is an important factor generally in mediating child disruptive behavioural disturbance.

4.10 General discussion

4.10.1 The choice of the preschool age group

If, as proposed by current theories, the clinical syndrome of hyperactivity results from abnormal development of self-regulatory competence then it is intuitive that early intervention may offer the opportunity to provide a corrective intervention and promote normal development of self-regulation. In this respect little is known about the development of negative EE in the mothers of children affected by hyperactivity and the role of this in the causation and maintenance of the disorder.

The literature on the role of EE in adult psychopathology explores the nature of maternal EE; that it may reflect a maternal trait or, alternatively that maternal EE represents the mother's emotional response to their child's difficult behaviour (Rosenfarb, Goldstein, Mintz and Nuechterlein, 1995). In the paediatric literature the links between high maternal EE, in the form of critical, intrusive care-giving, disorganised attachment and disordered

development of self-regulation are beginning to be explored (Jacobsen, Hibbs and Ziegenhain, 2000; Olson, Bates, Sandy and Lanthier, 2000). Thus it may be that by intervening at an early stage in development, critical mother-child interaction may be modified which in turn may provide a corrective influence on the development of disordered self-regulation and vulnerability to hyperactivity. Herein lies the theoretical basis of this study. However, the examination of hyperactivity in the preschool population posed a number of challenges as follows:

4.10.2 The validity of hyperactivity in preschool children

There is some debate about the validity of the diagnosis of hyperactivity disorders in the preschool period (DuPaul, McGoey, Eckert and VanBrakle, 2001). The debate in part arises from the difficulties encountered in making the diagnosis of hyperactivity in this age group. The core features of hyperactivity are all exaggerations of normal behavioural traits and thus the distinction between normality and disorder is difficult, particularly in the preschool period. Campbell (1985) discusses the importance of distinguishing between the vigorous three year old with boundless energy and unrestrained enthusiasm, and a child presenting with clinically significant overactivity, impulsivity and inattention. Various factors complicate the diagnosis in this age range including inherent developmental factors in the child, situational variation of presentation and differences in attribution and tolerance of behaviour amongst key adults, parents and professionals.

The preschool period represents a time of rapid development, thus the child's ability for sustained attention increases dramatically between the ages of two and three years (Ruff, Lawson, Parrinello and Weissberg, 1990). Similarly the child's motor abilities improve significantly with the acquisition of new skills and abilities. Once mastered such skills are exciting for the child who will wish to practice their newly acquired abilities and will resist attempts to prevent them from doing so. When is activity and shift of interest a reflection

of normal exploration and curiosity and when a reflection of inadequate attention and motor overactivity? Where is the dividing line between normal excitement and a failure to internalize normal standards of behavioural control?

The diagnosis of hyperactivity is further complicated by the variability in presentation across situation and time. The severity of presenting problems results from the child's interaction with the environment and the demands placed upon them. Thus some hyperactive preschoolers will have great difficulty in the nursery setting, surrounded by other children and a vast array of different activities whilst they may be content and settled when they are alone with their mother and suitably stimulated and entertained. By contrast another hyperactive child may function well in nursery where they are provided with structure and limits whilst at home or in the supermarket their capacity for self-control is overwhelmed.

The tolerance and knowledge of adults is also an important factor in determining whether the child is referred to the clinic or not. Referral of children to professionals is precipitated by parents or carers because they are concerned about the child, because they find their behaviour intolerable or both. Thus, parents with limited knowledge of child development and age appropriate behaviour may present with a child whose behaviour is essentially normal but is nevertheless disturbing to them. Also, parents who are experiencing difficulties in their own right (e.g. a depressed mother) may find intolerable the normal exuberance of a preschool child. Other families may tolerate very high levels of disruptive behaviour and be relatively unconcerned about this whilst involved professionals are troubled by the child's difficulties.

Professionals may also be affected by biases and limitations in their knowledge and understanding of hyperactivity. The literature on hyperactivity is vast but the bulk of this

focuses on children above the age of six years and so there is little practical help for professionals dealing with the preschool population. Thus whilst ICD-10 (World Health Organisation, 1992) and DSM-1V (American Psychiatric Association, 1994) insist on onset before the age of six or seven years they provide no guidance on a lower age limit, below which the diagnosis should be made with caution. The diagnostic criteria of both systems of classification were developed for children of primary school age and are therefore less useful for the very young.

4.10.3 Barriers to early identification

In clinical practice it is not uncommon for mothers to recount histories of behavioural disturbance from very early in their child's life. Anecdotal comments about early temperament often include features such as irritability and irregularity of feeding and sleeping patterns. These are some of the characteristics of the "difficult" child described by Thomas and Chess (1977) in their work on infant temperament, which were associated with the development of behavioural and psychiatric problems later in life. In this study most of the mothers dated the onset of their child's behavioural problems from the age of 18 months to two years, usually in association with the child's development of gross motor competence enabling mobility. This confirms previous research which suggests that evidence of vulnerability to hyperactivity disorders is present and detectable by those who know a child well at an early stage (Barkley, 1990).

In most cases mothers reported that they had sought professional help for their child's behavioural difficulties early on. This usually involved discussion with health visitors or general practitioners and mothers invariably reported that they had been advised that their child was "going through a phase" or that the child would "grow out of it". Another commonly reported comment by professionals was that "he's just a typical wee boy". Whilst this is anecdotal information it was consistently reported and is therefore

noteworthy and reflects the fact that many professionals believe that behavioural problems in the preschool period are transient and represent a passing phase in the child's development. Whilst in some cases this is true, there is evidence that up to 70% of children later diagnosed with hyperactivity were identifiable during the preschool period (Barkley 1981)

The reluctance on the part of professionals to investigate maternal reports of child behavioural problems is influenced by a number of factors including the popular belief that mothers are unreliable in reporting their children's behavioural problems. There is a literature examining this issue which although mixed in terms of its conclusions does provide evidence that mothers are reliable in identifying their children's behavioural problems (Diamond 1993, Harris, 1994) and that such reports are predictive of later diagnoses of disruptive behaviour disorders (Faraone, Biederman and Millberger, 1995). Generally there is a lack of training amongst primary care professionals in childhood behavioural problems and a lack of a standardised approach to screening children for early evidence of such difficulties. These problems are compounded by the lack of well worked out diagnostic criteria and operationalised screening instruments for this age group. Also, there is a natural reluctance to label and thereby pathologise childhood behavioural problems especially when the core behaviours are exaggerations of normal childhood behavioural traits. Further there is a tendency to assume that such problems are transient in this age group and therefore not in need of intervention. Finally there is the "neurotic mother" phenomenon whereby a child's problems are attributed to their mother's overanxious approach or inadequacies as a parent. Thus there is a need for training in child behavioural development and the presentation of behavioural disorders in the preschool age group for primary health care professionals and other child care professionals such as nursery staff.

4.10.4 Changes in outcome measures

From the above it can be seen that significant changes occurred in the levels of reported hyperactivity, conduct problems and maternal EE. Whilst it is likely that these changes occurred as a result of the intervention programme, other possibilities must be considered. The nature of the reported study is such that an association between the changes in child behaviour and maternal EE can be described nevertheless causality cannot be assumed.

The improvements may have occurred spontaneously. Thus the influence of the children's development on their behavioural profile may be significant and some of the improvement in their presentation may be attributable to their on-going development. The fact that no such changes were observed in the control groups suggests that the improvements were related to the intervention programme which was designed specifically to address the high levels of maternal EE and maladaptive parenting strategies seen in hyperactivity. By equipping mothers with an understanding of their children's behaviour and their developmental needs it is postulated that mothers were facilitated in adjusting their parenting style to address their child's difficulties. In turn the mothers were able to facilitate their child's developing capacity for self-regulation. This is discussed further in the following section where various aspects of the Programme are described in relation to theories of the development of self-regulation.

4.10.5 The theoretical basis of the intervention programme

The intervention programme was multifaceted and was designed to address the objectives of the study i.e. reducing maternal EE. This was achieved by targeting key factors known to be associated with EE and in particular the child's behavioural disturbance. Thus the mothers were educated about the nature of their child's disorder with the aim of addressing the hostile and negative attributional styles known to exist in the mothers of children with

disruptive behavioural disorders, and were equipped with the skills to manage their children's difficult behaviour.

4.10.5.1 Engagement

Careful consideration was given as to how to engage mothers in the treatment programme. Empirical evidence suggests that mothers of children with hyperactivity experience more parenting related stress and feel deskilled as parents (Barkley, 1997). Also many mothers of children with disruptive behavioural problems feel guilty and blame themselves for their child's problems (Mash and Johnston 1983). "It must be something I am doing wrong", "I am a bad mother", "I am a hopeless mother, I just can't control him", are common statements made by mothers of children with hyperactivity. Mothers report that the approach adopted by some professionals confirms their beliefs regarding their responsibility for causing their child's behavioural problems. By offering parent training (appropriately) to treat disruptive behaviour, clinicians may inadvertently confirm a mother's suspicions that she is responsible for her child's problem. When it is recommended to the mother that she attend for "parent training" so she is better able to control her child, she may perceive this as an affirmation of her belief that she has caused her child's problems. This in turn may result in the rejection of the recommended treatment and disengagement.

Thus, the way in which parent training is described to mothers is crucial in the process of engagement. Barkley (1997) emphasises that an important first step in the treatment of hyperactivity is to advise parents that the strategies they would usually successfully employ to manage a child's behaviour do not work with hyperactive children. The Preschool Overactivity Programme (POP) was described to mothers in considerable detail and it was emphasised that the nature of the child's difficulties necessitated particular

management skills. The purpose of the parent management training programme was therefore to equip mothers with additional skills and techniques in managing difficult behaviour. In this respect the inclusion of the children's programme was also important in that it served to reinforce the view that the behavioural difficulties were not caused by the mothers but rather represented an inherent difficulty for which the children required intervention in their own right.

4.10.5.2 Addressing maternal need

The mothers of hyperactive children are often stressed, de-skilled and feel guilty about their child's behavioural problems. In addition maternal hostile attributions about their child's behaviour are common. A key component of the Programme involved addressing these underlying issues. Such views and fears were challenged through the psychoeducational aspects of the Programme. At the same time a positive approach to the child and their behaviour disorder was promoted with an underlying philosophy of mutual respect between mother and child. Clinical experience suggested that it was necessary to address these issues, thereby attending to the mothers own needs, before asking the mothers to modify their management strategies.

In many cases the mothers in this study commented that they felt that their children were behaving badly as a way of getting at them. The fact that the children could behave well in some circumstances, invariably when they were in someone else's charge, was used as further evidence by the mother's that their child's behaviour was directed at them. Such findings are in keeping with research which has described maternal hostile attributions about their child's behaviour (Olson, Bates, Sandy and Lanthier, 2000). These views were challenged as part of the Programme. The mothers were provided with information about normal child emotional and behavioural development and the importance of not expecting

adult behavioural control from children. Mothers were taught about the core symptoms of hyperactivity and were encouraged to think about the world from their child's point of view.

4.10.5.3 Mediational versus contingency management approaches to parenting

The most commonly used programmes described in the literature (Anastopoulos and Barkley, 1989, Pisterman et al 1989) have been derived from the work of Patterson (1982) and Forehand and McMahon (1981). These programmes employ contingency management approaches to help parents control their child's behaviour. In contrast, Blakemore, Shindler and Conte. (1993) discuss a mediational approach to parenting in which the role of the parent of a child with disruptive behavioural problems is broader than the application of contingencies. Their approach highlights the nature of hyperactivity as a disorder of self-regulation or self-control and emphasises the role of the parent in facilitating the development of child self-control. Thus different styles of parenting either promote or inhibit the development of self-control. Typically an authoritarian approach to parenting characterised by a rigid approach to discipline with an attempt to shape the child's behaviour according to set standards, is associated with low levels of self-reliance and social responsibility in children (Baumrind, 1977). A more "informational" approach to parenting in which parents acknowledge the child's feelings in a situation and provide knowledge related to the outcome of an event are more likely to facilitate the development of the child's self-control (Koestner, Ryan, Bernieri and Holt, 1984).

POP was developed to encourage this informational/mediational style of parenting emphasising the importance of employing reasoning rather than power to achieve behavioural control. Parents were encouraged to see themselves as having more of a role in their child's life than that of applying limits and contingencies. They were encouraged to

see themselves as helping the child to understand and learn about the complicated world in which they live by interpreting, selecting and explaining experiences (Feuerstein, Rank and Rynders, 1988).

4.10.5.4 Combined parent management and child behaviour programme

Existing evidence suggested that a programme including both parent management training and a child behaviour programme might offer the greatest potential to achieve the objective of promoting a positive outcome in children with disruptive behaviour disorders (Horn, Ialongo, Greenberg, Packard and Smith-Winberry, 1990; Cousins and Weiss 1993). In this way direct work could be done with the mothers to reduce EE. Incorporating a child behaviour programme allowed the opportunity for direct intervention with the child in terms of addressing their difficulties. There is evidence that maternal criticism reduces when improvement is seen in the child's core behavioural difficulties. This has been reported in association with treatment with psychostimulant medication but it may equally occur when symptom improvement is achieved by other means.

In addition, a secondary but important effect of providing a child group was the effect on maternal engagement. By working directly with the children, the mothers were affirmed in their belief that their child presented with difficult behaviour. In this way the child group may have "legitimised" the mothers' attendance or even obliged them to attend the Programme such that their children could receive treatment whilst they received help to help their children.

4.10.5.5 Psychoeducation

The value of psychoeducation in the management of psychiatric disorders has been reported and it was a key component of the parent training programme. Thus the parents programme included an overview of the nature of hyperactivity disorders, their causation and presentation, together with a review of normal child development and behaviour. By providing mothers with information about hyperactivity it was hoped that they would be less likely to hold hostile attributions about their child's behaviour and that, with a better understanding of their child they would feel more positive towards them. By providing information about hyperactivity mothers were encouraged to shift their view of their child's behaviour as intentional and in this way it was thought that mothers would be better motivated to try new management techniques. Mothers commented on the value of the educational component of the programme at reviews with statements such as "I understand more about his behaviour now". Mothers also commented that this in turn allowed them to deal differently with their child.

Mothers were taught about an informational/mediational approach to helping their child with their behaviour. Here the aim was that the child's behaviour would be managed more appropriately and their development facilitated. In addition a secondary benefit of improved maternal confidence would be achieved. When a parenting intervention is applied successfully the parent is immediately reinforced by the child's response which has the effect of promoting the parent's feelings of competence. This in turn facilitates positive mother-child interaction whereby mothers who are secure and confident in their management of their children are more inclined to think positively about them.

4.10.5.6 Techniques

In addition to psychoeducation, various techniques drawn from existing evidence based programmes were used in POP including, in the parents group, case vignettes, video feedback and video modelling, homework, and group support and discussion. In the children's group an informational approach as described above was employed. Various behavioural techniques were used with the children including modelling, praise and encouragement for positive behaviours, ignoring negative behaviours and distracting to positive activities, "time out" and peer competition.

4.10.5.7 Non-specific aspects

The supportive component of the Programme and the review interviews may have been important. Mothers were aware from the outset of their involvement in the Programme that they would be followed up for a year. They were also aware that they could contact the therapists in between sessions during the course of the programme and also between reviews if they wished to do so. Similarly therapists would offer to see mothers out with sessions if they raised issues that were not appropriate for discussion in the group. In fact such situations rarely arose and were usually precipitated by unrelated but urgent family issues. Undoubtedly this provided a form of indirect support to the mothers but it could be argued that this is in keeping with normal clinical practice in that therapists are required from time to time to deal with other issues in addition to the primary presenting problem.

As well as assessing the children's symptoms at each review there was the opportunity for informal discussion about progress and mothers were reminded about the basic principles of the Programme and were referred to the handbook. Thus the review sessions served as booster sessions (Anastopoulos and Barkley, 1989).

Other non-specific factors which might be important include the fact that some of the mothers kept in touch with each other and continued to provide support to each other. This is in keeping with existing knowledge regarding the role of self-help groups (Chappel and DuPont, 1999; Heshka et al, 2000). In the context of the Programme the mothers commented that they found it useful to discuss their difficulties with other people in a similar situation and to hear other mothers describe their feelings about their children. Thus mothers may have been reassured to hear that other mothers were exasperated by their children and at times actively disliked them. Such sharing of experiences and feelings may have helped to address the mother's guilt and feelings of inadequacy as parents.

4.11 Low dropout

Only three mother-child pairs dropped out of the intervention programme. This low dropout rate may have been influenced by a number of factors including the nature of the clinic, the severity of the children's presenting problems and parental motivation to seek help. The Programme was based in a university clinic which is a recognised regional treatment centre for hyperactivity disorders and which is known to the local parent support groups. In addition, the mothers were aware of the fact that the Programme was part of a research project. The effect of participation in a research study on compliance has been described in the literature (Vitiello et al, 2001) and this may have been important in engaging families in treatment.

The referral process by which children and their families arrived at the clinic may also have been important. All had been assessed at primary/secondary care level, where they had presented because of the level of difficulty they were experiencing with the child's behaviour. Most parents expressed their desperation for help and in general were relieved to find that treatment was being offered. In addition many of them reported an extensive struggle to gain access to treatment. Mothers often stated that they had reported concerns

about their child's behaviour to health care professionals from early on in the child's life and felt that they had not been adequately listened to or their concerns taken seriously. Acknowledging the problem and its severity together with offering an intensive intervention which included a component targeting the child directly, may have been important in engaging mothers.

4.12 Limitations

This study was limited in a number of ways.

4.12.1 Study design

The study design was that of a before and after intervention study with a waiting list control. As described above, the power of such studies is considerably less than that of a randomised placebo controlled trial in demonstrating the effectiveness of intervention. The practical and ethical issues associated with randomised placebo controlled trials of psychosocial interventions have been rehearsed earlier in this section.

The primary aim of this study was to examine in a preliminary way the role of EE in childhood hyperactivity and the effect of intervention on modifying this on outcome. In view of this an observational study with a waiting list control was chosen as the study design. The use of a waiting list control group ensured that no child was denied treatment longer than would have been dictated by the real life clinical situation.

The intervention programme involved both a parent and a child programme and it was not possible to examine the relative contributions of the two components. It is likely however that both components were important to the overall power of the intervention. The parent

training programme was important for the reasons described elsewhere and in addition the child programme was important in terms of promoting the development of the children's behavioural control and in addition, may have served an important function in engaging the mothers. Anecdotally the mothers commented on the fact that the intervention involved direct help for their children as well as helping them.

A larger scale study employing a randomised controlled design would allow the opportunity to examine in more detail the relative contribution to the improvement in the children's behavioural adjustment of the various components of the programme. In a further study it would also be possible to examine the more non-specific aspects of the mother and child programmes which may have been important in effecting improvement, factors such as the support the mothers derived from each other.

4.12.2 Clinic sample

Another limitation of the study is that it was based on a clinic referred sample rather than a general population sample. Thus the findings cannot be generalised to all hyperactive children. Further studies should explore the role of EE in mediating hyperactivity in the general population. The role of intensive interventions such as the one described here may most appropriately lie in the treatment of more severely affected children. However, the identification of those elements of such programmes which might confer benefit to vulnerable children is important and the transfer of this clinic based programme to the community as a preventive intervention may be useful.

The process of recruitment of the sample is also important. Rates of referral of preschool aged children with hyperactivity to the clinic were traditionally low. Instead preschool

children with behavioural problems were seen at community child development clinics (CDCs) by clinical psychologists. The researcher and colleagues within the Department of Child and Adolescent Psychiatry actively encouraged referral to the intervention programme by means of liaison with the CDC staff. This included discussing the nature of hyperactivity disorders and the nature of the intervention programme. This may have introduced a bias in terms of the nature of the children referred to the programme in that children presenting with severe behavioural problems were potentially more likely to be referred. This is reflected in the behavioural profiles of the children.

4.12.3 Sample size

The numbers of children included in this study were relatively small. Nevertheless they were sufficient to allow changes to be demonstrated and in this respect, the study was adequately powered. In view of the small numbers however, the study may not have revealed significant relationships which may exist and have been demonstrated with a larger sample.

There were insufficient numbers of subjects in the study to allow an examination of the differences between males and females or children with hyperactivity without comorbid conduct problems. The existing literature addresses gender differences (Gaub and Carlson, 1997) although the information describing the effect of gender on treatment response is limited. Other comparable studies have also not controlled for conduct problems and it may be that doing so is difficult in the preschool population in view of existing epidemiological evidence which suggests that such comorbidity is the norm in this age group (Lavigne et al, 1996).

4.12.4 Control group

A waiting list control group was introduced to control for the possibility that any improvement in the child's behavioural presentation may have occurred spontaneously. The control group was similar to the study sample in terms of their emotional and behavioural adjustment and the levels of maternal EE. This is not surprising in view of the fact that subjects and controls were recruited from the same clinic. However, the control group was small in numbers limiting possible comparisons with subjects. It had been anticipated that a waiting list would develop over the course of the study, however, because the rate of referral to the Programme was slow to establish, a waiting list did not develop until the end of the study period and so the number of controls recruited was less than had been expected.

A further limitation relates to the timing of the assessments of controls at baseline (Time 1) and ten weeks later (Time 5). This ten week period was chosen to reflect the duration of the intervention programme and thereby control for any spontaneous change in the primary outcome measures. The practical limitations imposed by the clinical setting of the study meant that it was not possible to extend the review period as this would have involved delaying the controls from going on to take part in the intervention programme. This does however mean that the final assessment of the controls at Time 5 does not coincide with any of the timings of the subjects' assessments and so direct comparisons cannot be made. Nevertheless the Time 5 review does provide evidence for the natural progression of the primary outcome measures for a period equivalent to the duration of the intervention.

4.12.5 Limitations of the outcome measures

The limitations associated with the various outcome measures are discussed earlier in this section along with the descriptions of the measures.

4.12.6 Lack of involvement of other family members

The study primarily concentrated on the mothers and children in terms of both assessment and intervention. This was dictated by the study hypothesis. Some involvement of other family members was ensured as described in the Methods section of this thesis, by encouraging their participation in the home work and "relative's evenings". The role of fathers in hyperactivity was not assessed in this study. Assessment focused on the mothers report of the child's symptoms and also on maternal EE. Thus the assessment of the EE environment of the child was not complete. The adequate description of the whole EE environment of the child would involve consideration of the role of all family members including fathers and siblings.

The rating of the mother-child interaction focused on maternal affective expression and did not record the influence of the child's behaviour on maternal warmth or criticism. Thus a dyadic interactive approach to the assessment of mother-child affective interaction would allow further exploration of the bidirectional model of EE discussed in the Introduction to this thesis (King, 2000).

The role of and effect on other children in the families of hyperactive children also requires consideration. It is recognised that unaffected siblings of hyperactive children feel left out in view of the level of parental attention demanded by the hyperactive child. In addition increased levels of conflict between hyperactive children and their siblings are reported compared to normal sibling dyads (Taylor, Sandberg, Thorley and Giles, 1991). Anecdotal reports in this study support these findings with many mothers describing their disquiet about the fact that they had to spend more time with their hyperactive child than with their other children. Thus a programme which addresses the needs of all family members may provide added benefits in terms of the overall emotional environment of the child.

4.12.7 Reliability of the data and rater bias

The researcher (JB) was both the inventor and deliverer of the intervention. This was appropriate in terms of the development of the intervention programme and also necessary in terms of the practical limitations of the study. It was appropriate for the researcher to deliver the programme and experience first hand the reaction of the study participants. Video material of the children's group was reviewed by the lead therapists to ensure consistency of treatment. Similarly in the early stages of the programme video material of the mother's group was also reviewed for the same purpose.

The data for this study were collected and coded by the researcher. Whilst the ideal would have been for all the measures to be coded by raters blind to treatment status, this was not possible for practical reasons. Instead 20% of each of the measures (randomly selected) were coded by research assistants (RA's) who were blinded to the status of the children in terms of their treatment. Inter-rater reliabilities were calculated and as reported above ranged from good to very good (Altman, 1999). Various measures were adopted to ensure the reliable rating of the data. Thus raters received training in the use of the PACS and the coding systems for the EE and mother-child rating systems all of which are operationalised.

4.12.8 Missing data

The amount of missing data throughout the study for both subjects and controls was relatively small and is not thought to have significantly influenced results. However, certain outcome measures seemed more vulnerable to incomplete data. Thus mothers were more likely to not attend for the mother-child assessment than the PACS interview. Mother-child interaction was often assessed on a different day from the PACS. This was done such that mothers could be interviewed (PACS) without their child being present and

to minimise the time the child had to spend at the hospital for assessment. It is likely that the mother found the observational assessment the most difficult in view of the fact that they knew that they were being watched.

The discrepancies between PACS data and EE data are explained by technical problems with recording equipment. Whilst the PACS scores were recorded by the interviewer as the interview progressed, EE ratings were performed subsequently by reviewing the videotapes of the interviews.

4.12.9 Nature of the data

The data collected in this study were quantitative. During the course of the study and on reviewing the videotapes of the interviews with mothers, the power of the spontaneous remarks they made about their feelings and thoughts about their children, themselves and their relationships with their children raised questions about the adequacy of the evaluation methods in capturing the complexity of the EE environment of the child. Quantitative methods of managing data are able to describe this in a limited way but in no way adequately describe the wealth of information. Qualitative methods may allow this data to be described and examined in a more informative and useful way.

Other authors have commented on the limitations of existing measures of EE. Thus Baker, Heller and Henker (2000) highlighted the richness of the information yielded during the assessment of EE in their study which was not captured by the prescribed coding system. These authors were using the FMSS and explored the possibility of expanding the coding system, although this was problematic. The development of alternative measures and methods of assessment is an area for future research perhaps employing a combination of

quantitative and qualitative measures of maternal EE and observed mother-child interaction and taking note of the bidirectional nature of affective expression.

4.13 Implications for service provision

This study adds to the evidence for early identification and intervention in hyperactivity and other disruptive behaviour disorders. It also highlights the need for education of frontline workers in the nature and presentation of hyperactivity in the preschool period and the importance of early intervention for the well being of the child and their family.

Recent estimates of the prevalence of hyperactivity disorders based on conservative ICD criteria suggest that 1% of children may be affected (Meltzer, Gatward, Goodwin and Ford, 2000). Epidemiological studies have identified similar prevalence figures in the preschool population (Lavigne et al 1996). Despite this, hyperactivity continues to go unrecognised in the preschool population reflected by the low levels of referrals of this age group to psychiatric services. Parental reports suggest that mothers and families are aware of their child's difficulties from very early on in the child's life and that in many cases they seek professional help.

Children are not referred on to specialist services for help for a variety of reasons but primarily because the professionals to whom mothers turn for help have not received adequate training in the nature, presentation and management of disruptive behaviour disorders in preschool children. Many believe that such disorders are transient or that mothers concerns represent their own limitations or inappropriate expectations. Thus opportunities for intervention are being missed. This study has confirmed this position. There are therefore implications for the appropriate training of frontline childcare professionals.

Considering developmental models for the causation of hyperactivity disorders, it is possible that early intervention might prevent the maintenance or progression of disorder. Thus by targeting children who present with the features of hyperactivity at an early stage it may be possible to either prevent some from developing disorder or modify the severity of the disorder. The development of the negative EE identified in families of children with hyperactivity may also be averted by early intervention, this is an area for further investigation.

The health economic aspects of hyperactivity must also be considered. It is recognised that many children with hyperactivity disorders continue to present with some of the features of the disorder into adult life. In some cases especially where hyperactivity is comorbid with CD, severe antisocial behaviour and even personality disorder may develop. This may be enormously costly for the affected child or young person, their family and ultimately for society which bears the cost of long term care, social support or even incarceration of the disturbed individual.

These potential advantages have to be set against the costs of psychosocial intervention which are not inconsiderable. The model adopted for the delivery of the intervention programme in this study offers advantages in terms of providing for the adequate resourcing of a labour intensive psychosocial intervention programme whilst at the same time promoting the transfer of skills to key child care workers.

The resourcing of psychosocial intervention programmes for children with disruptive behaviour disorders is problematic. The majority of child and adolescent mental health services are under-resourced and struggle to provide even basic assessment and intervention. The provision of intensive psychosocial intervention as described in this

study and others (e.g. the MTA study) is beyond the capacity of most services. Therefore a degree of creativity is required in order to provide such resources. In this case whilst some funding was secured from a local charity other staff had to be found in order to support the one to one child to therapist ratio required in the child treatment programme. A third therapist became available following discussions with the Hospital Education Service who seconded a senior teacher to the Programme for one and a half days per week. This however left a short fall of therapists and after considerable thought it was decided to offer the Programme to other professionals as a training resource. The therapists' training programme was developed accordingly. The Programme was offered to trainees in the Department including nursing, medical and psychology staff. Thereafter it was offered to associated professional groups. In particular many of the nurseries which the children were attending expressed an interest in the work of the Programme and were offered the opportunity to second staff to the training programme. Health visitors expressed similar interests and were offered training places. The training programme proved to be a popular resource and very soon a waiting list was established which exceeded the waiting list for treatment, providing further evidence of the need for such training.

Thus the groups were adequately staffed at no extra cost to the hospital Trust. In return for their investment in terms of their time health, education and social work staff received intensive training in child behaviour management and parent management training which included both theoretical and experiential components together with live supervision of child behaviour therapy. In this way frontline staff were equipped with important skills for managing challenging, disruptive behaviour. Such a multi-agency approach to the provision of child mental health services has much to commend it in the current climate. Health, education and social services are all involved in ensuring the wellbeing of children

and opportunities for joint working and training offer enormous benefits in terms of standardisation of approach, not to mention the potential financial benefits.

4.14 Directions for Future research

As with most research this study has generated as many if not more questions than it answered. Whilst it has provided further evidence for the importance of psychosocial intervention in the management of hyperactivity disorders in the preschool period, further work is needed to address the relative contribution of the various components of the intervention.

This will require a sufficiently powered randomised controlled trial. The selection of a range of outcome measures to adequately describe the effect of intervention requires careful consideration. Thus the use of valid and reliable measures to assess child emotional and behavioural presentation is essential. This might include parental report and the report of independent witnesses such as nursery or school staff. A more detailed observational measure of the child would enhance the overall description of the child's presentation.

The role of EE in hyperactivity requires further investigation. Existing studies, including the present study, have described an association between high levels of negative EE (criticism) and disruptive behaviour disorders but the origins of such interaction and the developmental progression require further examination.

This study highlighted the challenges in adequately describing the EE environment of the child. The importance of EE in childhood behavioural disorders is emerging and whilst existing measures have value further consideration should be given as to how effective

they are in capturing the nature of mother-child and parent-child interaction, an issue highlighted in this study and commented on by other authors (Baker, Heller and Henker, 2000). The measures used to assess both EE and mother-child interaction, whilst providing quantitative data, failed to capture the richness and complexity of both phenomena. In this respect qualitative data analysis may be more useful.

A number of non-specific factors were felt to be important in the effectiveness of this intervention but were not formally assessed. Examination of factors which facilitated engagement should be teased out such as the role of the child programme, the attention to maternal emotional needs (particularly their guilt about their child's difficulties) and the importance of psychoeducation. Here again, the role of qualitative techniques of data analysis may be important.

To date it is not possible to predict which treatment will be the most beneficial for which child and family at which point in time. In this study it was not possible to identify robust and useful predictors which would allow the targeting of particular mothers and their children for the intervention. A larger study might allow the identification of factors which would predict response to this type of psychosocial intervention.

There is an ever increasing body of literature describing the nature of hyperactivity and associated comorbidities and considerable evidence for the biological basis of hyperactivity, especially the genetic contribution. However the precise mechanism whereby the combination of vulnerabilities results in the expression of hyperactivity is unclear. It is likely however that this is the result of the combination of different factors in different children. It would seem important therefore that future research addresses the detailed profiling of children in terms of the adequate description of their vulnerabilities.

This in turn might help inform the development of tailor made interventions for children and their families.

As discussed above, the health economic aspects of hyperactivity disorders and their treatment require further attention. Information to date on the cost of childhood disruptive behaviour disorders is limited. It is however clearly established that in some cases hyperactivity can persist through childhood into adolescence and adulthood. In addition hyperactive children may be at risk of the development of comorbid disorders which may be equally if not more disabling. In particular children with comorbid CD may be at considerable risk of long term disability and at worst anti-social behaviour or personality disorder. Thus there is a need in the current climate to address the economics of early intervention. The benefit of expensive psychosocial interventions in early childhood includes not only the immediate relief of suffering by the child and their family but also the potential long term benefit to that child, their family and society as a whole.

4.15 Conclusions

This study has successfully addressed the research aims. It has described the relationship between hyperactivity and maternal EE, it has described the effect of the intervention Programme on maternal EE and has examined the effect of modifying maternal EE on outcome of preschool children with hyperactivity.

In addition the study has added to the existing literature describing the effect of psychosocial interventions in the management of children with hyperactivity disorders. Whilst other authors have described the value of such interventions, the bulk of the literature addresses their role in school age children. This study is important therefore in

that it adds to the literature describing the value of such interventions in the preschool population.

The study is unique in that it addresses the role of an intervention which modifies maternal EE in hyperactivity. As such the study has added to the literature on EE in childhood psychiatric disorders. EE is established as an important aspect of a range of adult psychiatric disorders and there is a limited literature describing high levels of critical EE in childhood disruptive behaviour disorders but little specifically addressing this phenomenon in childhood hyperactivity.

The limitations of the study mean that further research is necessary to tease out the details of the nature of the emotional climate between mother and child, to identify those aspects which facilitate the development of self-regulation. Also further work is needed to identify the details of the relationship between EE and childhood hyperactivity and EE and conduct problems. Psychosocial interventions are costly to both the service provider and the consumer. Ideally an evidence base is required which will allow prediction of those families who will respond best to these types of intervention.

Finally the study addresses indirectly the sociological aspects of childhood behavioural disorders and highlights the importance of addressing the child's vulnerabilities in the context of their family environment. It adds to the developing literature describing an association between disrupted attachment and critical parenting particularly by mothers in the development of disordered self-regulation. The findings are in keeping with current views of the causation and maintenance of childhood psychiatric disorders which emphasise the involvement of multiple factors. Thus the cause of disorder in any child is complex and involves the interaction of numerous factors which result in the expression of

the behavioural phenotype. Intervention for children presenting with such complex neurodevelopmental disorders requires an holistic approach and individualised, tailor made interventions.

Further work is necessary to determine which child requires which intervention(s) at which stage in their development and the natural history of their disorder. In particular the early identification of disorder or vulnerability to disorder is essential such that intervention can be commenced at an early stage. This may have enormous benefits for children and families as well as the community as a whole in terms of the potential for prevention of severe, enduring and disabling psychiatric disorder.

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APPENDIX 1: SPSS OUTPUT

Wilcoxon Signed Ranks Tests: Subjects, Emotional Problems T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
emotional problems T2 - emotional problems T1	Negative Ranks	22[a]	20.02	440.50
	Positive Ranks	17[b]	19.97	339.50
	Ties	8[c]		
	Total	47		

a. emotional problems T2 < emotional problems T1

b. emotional problems T2 > emotional problems T1

c. emotional problems T1 = emotional problems T2

Test Statistics[b]

	emotional problems T2 - emotional problems T1
Z	-.705[a]
Asymp. Sig. (2-tailed)	.481

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
emotional problems T3 - emotional problems T1	Negative Ranks	27[a]	22.35	603.50
	Positive Ranks	15[b]	19.97	299.50
	Ties	3[c]		
	Total	45		

a. emotional problems T3 < emotional problems T1

b. emotional problems T3 > emotional problems T1

c. emotional problems T1 = emotional probelms T3

Test Statistics[b]

	emotional problems T3 - emotional problems T1
Z	-1.901[a]
Asymp. Sig. (2-tailed)	.057

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
emotional problems T4 - emotional problems T1	Negative Ranks	19[a]	17.82	338.50
	Positive Ranks	14[b]	15.89	222.50
	Ties	4[c]		
	Total	37		

a. emotional problems T4 < emotional problems T1

b. emotional problems T4 > emotional problems T1

c. emotional problems T1 = emotional problems T4

Test Statistics[b]

	emotional problems T4 - emotional problems T1
Z	-1.036[a]
Asymp. Sig. (2-tailed)	.300

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
emotional problemsT3 - emotional problems T2	Negative Ranks	26[a]	18.79	488.50
	Positive Ranks	11[b]	19.50	214.50
	Ties	8[c]		
	Total	45		

a. emotional problems T3 < emotional problems T2

b. emotional problems T3 > emotional problems T2

c. emotional problems T2 = emotional problems T3

Test Statistics[b]

	emotional problems T3 - emotional problems T2
Z	-2.068[a]
Asymp. Sig. (2-tailed)	.039

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
emotional problems T4 - emotional problems T3	Negative Ranks	11[a]	13.05	143.50
	Positive Ranks	17[b]	15.44	262.50
	Ties	8[c]		
	Total	36		

a. emotional problems T4 < emotional problems T3

b. emotional problems T4 > emotional problems T3

c. emotional problems T3 = emotional problemsT4

Test Statistics[b]

	emotional problems T4 - emotional problems T3
Z	-1.355[a]
Asymp. Sig. (2-tailed)	.175

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests: Subjects, Hyperactivity T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
hyperactivity T2 - hyperactivity T1	Negative Ranks	46[a]	24.43	1124.00
	Positive Ranks	1[b]	4.00	4.00
	Ties	0[c]		
	Total	47		

a. hyperactivity T2 < hyperactivity T1

b. hyperactivity T2 > hyperactivity T1

c. hyperactivity T1 = hyperactivity T2

Test Statistics[b]

	hyperactivity T2 - hyperactivity T1
Z	-5.926[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
hyperactivity T3 - hyperactivity T1	Negative Ranks	44[a]	23.48	1033.00
	Positive Ranks	1[b]	2.00	2.00
	Ties	0[c]		
	Total	45		

a. hyperactivity T3 < hyperactivity T1

b. hyperactivity T3 > hyperactivity T1

c. hyperactivity T1 = hyperactivity T3

Test Statistics[b]

	hyperactivity T3 - hyperactivity T1
Z	-5.819[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
hyperactivity T4 - hyperactivity T1	Negative Ranks	37[a]	19.00	703.00
	Positive Ranks	0[b]	.00	.00
	Ties	0[c]		
	Total	37		

a. hyperactivity T4 < hyperactivity T1

b. hyperactivityT4 > hyperactivity T1

c. hyperactivity T1 = hyperactivity T4

Test Statistics[b]

	hyperactivity T4 - hyperactivity T1
Z	-5.303[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
hyperactivity T3 - hyperactivity T2	Negative Ranks	29[a]	23.12	670.50
	Positive Ranks	14[b]	19.68	275.50
	Ties	2[c]		
	Total	45		

a. hyperactivity T3 < hyperactivity T2

b. hyperactivity T3 > hyperactivity T2

c. hyperactivity T2 = hyperactivity T3

Test Statistics[b]

	hyperactivity T3 - hyperactivity T2
Z	-2.385[a]
Asymp. Sig. (2-tailed)	.017

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
hyperactivity T4 - hyperactivity T3	Negative Ranks	19[a]	16.61	315.50
	Positive Ranks	13[b]	16.35	212.50
	Ties	4[c]		
	Total	36		

a. hyperactivity T4 < hyperactivity T3

b. hyperactivity T4 > hyperactivity T3

c. hyperactivity T3 = hyperactivity T4

Test Statistics[b]

	hyperactivity T4 - hyperactivity T3
Z	-.963[a]
Asymp. Sig. (2-tailed)	.335

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests: Subjects, Conduct Problems T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
conduct problems T2 - conduct problems T1	Negative Ranks	39[a]	23.90	932.00
	Positive Ranks	6[b]	17.17	103.00
	Ties	2[c]		
	Total	47		

a. conduct problems T2 < conduct problems T1

b. conduct problems T2 > conduct problems T1

c. conduct problems T1 = conduct problems T2

Test Statistics[b]

	conduct problems T2 - conduct problems T1
Z	-4.679[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
conduct problems T3 - conduct problemsT1	Negative Ranks	34[a]	25.81	877.50
	Positive Ranks	10[b]	11.25	112.50
	Ties	1[c]		
	Total	45		

a. conduct problems T3 < conduct problems T1

b. conduct problems T3 > conduct problems T1

c. conduct problems T1 = conduct problems T3

Test Statistics[b]

	conduct problems T3 - conduct problems T1
Z	-4.464[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
conduct problems T4 - conduct problems T1	Negative Ranks	29[a]	20.53	595.50
	Positive Ranks	7[b]	10.07	70.50
	Ties	1[c]		
	Total	37		

a. conduct problems T4 < conduct problems T1

b. conduct problems T4 > conduct problems T1

c. conduct problems T1 = conduct problems T4

Test Statistics[b]

	conduct problems T4 - conduct problems T1
Z	-4.124[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
conduct problems T3 - conduct problems T2	Negative Ranks	25[a]	22.42	560.50
	Positive Ranks	17[b]	20.15	342.50
	Ties	3[c]		
	Total	45		

a. conduct problems T3 < conduct problems T2

b. conduct problems T3 > conduct problems T2

c. conduct problems T2 = conduct problems T3

Test Statistics[b]

	conduct problems T3 - conduct problems T2
Z	-1.363[a]
Asymp. Sig. (2-tailed)	.173

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
conduct problems T4 - conduct problems T3	Negative Ranks	15[a]	17.60	264.00
	Positive Ranks	19[b]	17.42	331.00
	Ties	2[c]		
	Total	36		

a. conduct problems T4 < conduct problems T3

b. conduct problems T4 > conduct problems T3

c. conduct problems T3 = conduct problems T4

Test Statistics[b]

	conduct problems T4 - conduct problems T3
Z	-.573[a]
Asymp. Sig. (2-tailed)	.567

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests: Subjects, BCL T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
BCL T2 - BCL T1	Negative Ranks	0[a]	.00	.00
	Positive Ranks	5[b]	3.00	15.00
	Ties	17[c]		
	Total	22		

a. BCL T2 < BCL T1

b. BCL T2 > BCL T1

c. BCL T1 = BCL T2

Test Statistics[b]

	BCL T2 - BCL T1
Z	-2.236[a]
Asymp. Sig. (2-tailed)	.025

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
BCL T3 - BCL T1	Negative Ranks	0[a]	.00	.00
	Positive Ranks	5[b]	3.00	15.00
	Ties	10[c]		
	Total	15		

a. BCL T3 < BCL T1

b. BCL T3 > BCL T1

c. BCL T1 = BCL T3

Test Statistics[b]

	BCL T3 - BCL T1
Z	-2.236[a]
Asymp. Sig. (2-tailed)	.025

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
BCL T4 - BCL T1	Negative Ranks	0[a]	.00	.00
	Positive Ranks	2[b]	1.50	3.00
	Ties	8[c]		
	Total	10		

a. BCL T4 < BCL T1

b. BCL T4 > BCL T1

c. BCL T1 = BCL T4

Test Statistics[b]

	BCL T4 - BCL T1
Z	-1.414[a]
Asymp. Sig. (2-tailed)	.157

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
BCL T3 - BCL T2	Negative Ranks	3[a]	3.00	9.00
	Positive Ranks	2[b]	3.00	6.00
	Ties	11[c]		
	Total	16		

a. BCL T3 < BCL T2

b. BCL T3 > BCL T2

c. BCL T2 = BCL T3

Test Statistics[b]

	BCL T3 - BCL T2
Z	-.447[a]
Asymp. Sig. (2-tailed)	.655

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
BCL T4 - BCL T3	Negative Ranks	2[a]	2.50	5.00
	Positive Ranks	2[b]	2.50	5.00
	Ties	3[c]		
	Total	7		

a. BCL T4 < BCL T3

b. BCL T4 > BCL T3

c. BCL T3 = BCL T4

Test Statistics[b]

	BCL T4 - BCL T3
Z	.000[a]
Asymp. Sig. (2-tailed)	1.000

a. The sum of negative ranks equals the sum of positive ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests: Subjects, PBCL T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
PSBCL T2 - PSBCL T1	Negative Ranks	2[a]	3.00	6.00
	Positive Ranks	2[b]	2.00	4.00
	Ties	13[c]		
	Total	17		

a. PSBCL T2 < PSBCL T1

b. PSBCL T2 > PSBCL T1

c. PSBCL T1 = PSBCL T2

Test Statistics[b]

	PSBCL T2 - PSBCL T1
Z	-.378[a]
Asymp. Sig. (2-tailed)	.705

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
PSBCL T3 - PSBCL T1	Negative Ranks	1[a]	3.00	3.00
	Positive Ranks	2[b]	1.50	3.00
	Ties	11[c]		
	Total	14		

a. PSBCL T3 < PSBCL T1

b. PSBCL T3 > PSBCL T1

c. PSBCL T1 = PSBCL T3

Test Statistics[b]

	PSBCL T3 - PSBCL T1
Z	.000[a]
Asymp. Sig. (2-tailed)	1.000

a. The sum of negative ranks equals the sum of positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
PSBCL T4 - PSBCL T1	Negative Ranks	3[a]	2.00	6.00
	Positive Ranks	0[b]	.00	.00
	Ties	5[c]		
	Total	8		

a. PSBCL T4 < PSBCL T1

b. PSBCL T4 > PSBCL T1

c. PSBCL T1 = PSBCL T4

Test Statistics[b]

	PSBCL T4 - PSBCL T1
Z	-1.732[a]
Asymp. Sig. (2-tailed)	.083

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
PSBCL T3 - PSBCL T2	Negative Ranks	0[a]	.00	.00
	Positive Ranks	0[b]	.00	.00
	Ties	15[c]		
	Total	15		

a. PSBCL T3 < PSBCL T2

b. PSBCL T3 > PSBCL T2

c. PSBCL T2 = PSBCL T3

Test Statistics[b]

	PSBCL T3 - PSBCL T2
Z	.000[a]
Asymp. Sig. (2-tailed)	1.000

a. The sum of negative ranks equals the sum of positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
PSBCL T4 - PSBCL T3	Negative Ranks	3[a]	2.00	6.00
	Positive Ranks	0[b]	.00	.00
	Ties	4[c]		
	Total	7		

a. PSBCL T4 < PSBCL T3

b. PSBCL T4 > PSBCL T3

c. PSBCL T3 = PSBCL T4

Test Statistics[b]

	PSBCL T4 - PSBCL T3
Z	-1.633[a]
Asymp. Sig. (2-tailed)	.102

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests: Subjects EE, warmth (SPQ) T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
EEwarmth (spq) T2 - EE warmth (spq) T1	Negative Ranks	34[a]	17.50	595.00
	Positive Ranks	0[b]	.00	.00
	Ties	6[c]		
	Total	40		

a. EEwarmth (spq) T2 < EE warmth (spq) T1

b. EEwarmth (spq) T2 > EE warmth (spq) T1

c. EE warmth (spq) T1 = EEwarmth (spq) T2

Test Statistics[b]

	EEwarmth (spq) T2 - EE warmth (spq) T1
Z	-5.237[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE warmth (spq) T3 - EE warmth (spq) T1	Negative Ranks	30[a]	15.50	465.00
	Positive Ranks	0[b]	.00	.00
	Ties	6[c]		
	Total	36		

a. EE warmth (spq) T3 < EE warmth (spq) T1

b. EE warmth (spq) T3 > EE warmth (spq) T1

c. EE warmth (spq) T1 = EE warmth (spq) T3

Test Statistics[b]

	EE warmth (spq) T3 - EE warmth (spq) T1
Z	-4.873[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE warmth (spq) T4 - EE warmth (spq) T1	Negative Ranks	27[a]	14.00	378.00
	Positive Ranks	0[b]	.00	.00
	Ties	3[c]		
	Total	30		

a. EE warmth (spq) T4 < EE warmth (spq) T1

b. EE warmth (spq) T4 > EE warmth (spq) T1

c. EE warmth (spq) T1 = EE warmth (spq) T4

Test Statistics[b]

	EE warmth (spq) T4 - EE warmth (spq) T1
Z	-4.628[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE warmth (spq) T3 - EEwarmth (spq) T2	Negative Ranks	11[a]	9.00	99.00
	Positive Ranks	6[b]	9.00	54.00
	Ties	22[c]		
	Total	39		

a. EE warmth (spq) T3 < EEwarmth (spq) T2

b. EE warmth (spq) T3 > EEwarmth (spq) T2

c. EEwarmth (spq) T2 = EE warmth (spq) T3

Test Statistics[b]

	EE warmth (spq) T3 - EEwarmth (spq) T2
Z	-1.213[a]
Asymp. Sig. (2-tailed)	.225

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE warmth (spq) T4 - EE warmth (spq) T3	Negative Ranks	3[a]	3.50	10.50
	Positive Ranks	3[b]	3.50	10.50
	Ties	24[c]		
	Total	30		

a. EE warmth (spq) T4 < EE warmth (spq) T3

b. EE warmth (spq) T4 > EE warmth (spq) T3

c. EE warmth (spq) T3 = EE warmth (spq) T4

Test Statistics[b]

	EE warmth (spq) T4 - EE warmth (spq) T3
Z	.000[a]
Asymp. Sig. (2-tailed)	1.000

a. The sum of negative ranks equals the sum of positive ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests: Subjects, EE Critcism (SPQ) T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
EE criticism (spq) T2 - EE criticism (spq) T1	Negative Ranks	34[a]	17.50	595.00
	Positive Ranks	0[b]	.00	.00
	Ties	6[c]		
	Total	40		

a. EE criticism (spq) T2 < EE criticism (spq) T1

b. EE criticism (spq) T2 > EE criticism (spq) T1

c. EE criticism (spq) T1 = EE criticism (spq) T2

Test Statistics[b]

	EE criticism (spq) T2 - EE criticism (spq) T1
Z	-5.218[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE criticism (spq) T3 - EE criticism (spq) T1	Negative Ranks	28[a]	14.50	406.00
	Positive Ranks	0[b]	.00	.00
	Ties	8[c]		
	Total	36		

a. EE criticism (spq) T3 < EE criticism (spq) T1

b. EE criticism (spq) T3 > EE criticism (spq) T1

c. EE criticism (spq) T1 = EE criticism (spq) T3

Test Statistics[b]

	EE criticism (spq) T3 - EE criticism (spq) T1
Z	-4.759[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE criticism (spq) T4 - EE criticism (spq) T1	Negative Ranks	22[a]	11.50	253.00
	Positive Ranks	0[b]	.00	.00
	Ties	8[c]		
	Total	30		

a. EE criticism (spq) T4 < EE criticism (spq) T1

b. EE criticism (spq) T4 > EE criticism (spq) T1

c. EE criticism (spq) T1 = EE criticism (spq) T4

Test Statistics[b]

	EE criticism (spq) T4 - EE criticism (spq) T1
Z	-4.183[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE criticism (spq) T3 - EE criticism (spq) T2	Negative Ranks	9[a]	9.89	89.00
	Positive Ranks	8[b]	8.00	64.00
	Ties	22[c]		
	Total	39		

a. EE criticism (spq) T3 < EE criticism (spq) T2

b. EE criticism (spq) T3 > EE criticism (spq) T2

c. EE criticism (spq) T2 = EE criticism (spq) T3

Test Statistics[b]

	EE criticism (spq) T3 - EE criticism (spq) T2
Z	-.645[a]
Asymp. Sig. (2-tailed)	.519

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE criticism (spq) T4 - EE criticism (spq) T3	Negative Ranks	2[a]	3.50	7.00
	Positive Ranks	6[b]	4.83	29.00
	Ties	22[c]		
	Total	30		

a. EE criticism (spq) T4 < EE criticism (spq) T3

b. EE criticism (spq) T4 > EE criticism (spq) T3

c. EE criticism (spq) T3 = EE criticism (spq) T4

Test Statistics[b]

	EE criticism (spq) T4 - EE criticism (spq) T3
Z	-1.611[a]
Asymp. Sig. (2-tailed)	.107

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Subjects, EE Positive Remarks T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
EE positive remarks (WI) T2 - EE positive remarks (WI) T1	Negative Ranks	0[a]	.00	.00
	Positive Ranks	35[b]	18.00	630.00
	Ties	5[c]		
	Total	40		

a. EE positive remarks (WI) T2 < EE positive remarks (WI) T1

b. EE positive remarks (WI) T2 > EE positive remarks (WI) T1

c. EE positive remarks (WI) T1 = EE positive remarks (WI) T2

Test Statistics[b]

	EE positive remarks (WI) T2 - EE positive remarks (WI) T1
Z	-5.254[a]
Asymp. Sig. (2-tailed)	.000

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE positive remarks (WI) T3 - EE positive remarks (WI) T1	Negative Ranks	1[a]	6.50	6.50
	Positive Ranks	30[b]	16.32	489.50
	Ties	5[c]		
	Total	36		

a. EE positive remarks (WI) T3 < EE positive remarks (WI) T1

b. EE positive remarks (WI) T3 > EE positive remarks (WI) T1

c. EE positive remarks (WI) T1 = EE positive remarks (WI) T3

Test Statistics[b]

	EE positive remarks (WI) T3 - EE positive remarks (WI) T1
Z	-4.821[a]
Asymp. Sig. (2-tailed)	.000

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE positive remarks (WI) T4 - EE positive remarks (WI) T1	Negative Ranks	2[a]	4.50	9.00
	Positive Ranks	22[b]	13.23	291.00
	Ties	5[c]		
	Total	29		

a. EE positive remarks (WI) T4 < EE positive remarks (WI) T1

b. EE positive remarks (WI) T4 > EE positive remarks (WI) T1

c. EE positive remarks (WI) T1 = EE positive remarks (WI) T4

Test Statistics[b]

	EE positive remarks (WI) T4 - EE positive remarks (WI) T1
Z	-4.109[a]
Asymp. Sig. (2-tailed)	.000

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE positive remarks (WI) T3 - EE positive remarks (WI) T2	Negative Ranks	15[a]	12.80	192.00
	Positive Ranks	8[b]	10.50	84.00
	Ties	16[c]		
	Total	39		

a. EE positive remarks (WI) T3 < EE positive remarks (WI) T2

b. EE positive remarks (WI) T3 > EE positive remarks (WI) T2

c. EE positive remarks (WI) T2 = EE positive remarks (WI) T3

Test Statistics[b]

	EE positive remarks (WI) T3 - EE positive remarks (WI) T2
Z	-1.786[a]
Asymp. Sig. (2-tailed)	.074

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE positive remarks (WI) T4 - EE positive remarks (WI) T3	Negative Ranks	8[a]	7.94	63.50
	Positive Ranks	5[b]	5.50	27.50
	Ties	16[c]		
	Total	29		

a. EE positive remarks (WI) T4 < EE positive remarks (WI) T3

b. EE positive remarks (WI) T4 > EE positive remarks (WI) T3

c. EE positive remarks (WI) T3 = EE positive remarks (WI) T4

Test Statistics[b]

	EE positive remarks (WI) T4 - EE positive remarks (WI) T3
Z	-1.328[a]
Asymp. Sig. (2-tailed)	.184

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests: Subjects, EE Critical Remarks T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
EE critical remarks (WI) T2 - EE critical remarks (WI) T1	Negative Ranks	34[a]	17.50	595.00
	Positive Ranks	0[b]	.00	.00
	Ties	6[c]		
	Total	40		

a. EE critical remarks (WI) T2 < EE critical remarks (WI) T1

b. EE critical remarks (WI) T2 > EE critical remarks (WI) T1

c. EE critical remarks (WI) T1 = EE critical remarks (WI) T2

Test Statistics[b]

	EE critical remarks (WI) T2 - EE critical remarks (WI) T1
Z	-5.225[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE critical remarks (WI) T3 - EE critical remarks (WI) T1	Negative Ranks	29[a]	15.88	460.50
	Positive Ranks	1[b]	4.50	4.50
	Ties	6[c]		
	Total	36		

a. EE critical remarks (WI) T3 < EE critical remarks (WI) T1

b. EE critical remarks (WI) T3 > EE critical remarks (WI) T1

c. EE critical remarks (WI) T1 = EE critical remarks (WI) T3

Test Statistics[b]

	EE critical remarks (WI) T3 - EE critical remarks (WI) T1
Z	-4.792[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE critical remarks (WI) T4 - EE critical remarks (WI) T1	Negative Ranks	22[a]	12.32	271.00
	Positive Ranks	1[b]	5.00	5.00
	Ties	6[c]		
	Total	29		

a. EE critical remarks (WI) T4 < EE critical remarks (WI) T1

b. EE critical remarks (WI) T4 > EE critical remarks (WI) T1

c. EE critical remarks (WI) T1 = EE critical remarks (WI) T4

Test Statistics[b]

	EE critical remarks (WI) T4 - EE critical remarks (WI) T1
Z	-4.102[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE critical remarks (WI) T3 - EE critical remarks (WI) T2	Negative Ranks	13[a]	9.50	123.50
	Positive Ranks	7[b]	12.36	86.50
	Ties	19[c]		
	Total	39		

a. EE critical remarks (WI) T3 < EE critical remarks (WI) T2

b. EE critical remarks (WI) T3 > EE critical remarks (WI) T2

c. EE critical remarks (WI) T2 = EE critical remarks (WI) T3

Test Statistics[b]

	EE critical remarks (WI) T3 - EE critical remarks (WI) T2
Z	-.768[a]
Asymp. Sig. (2-tailed)	.449

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
EE critical remarks (WI) T4 - EE critical remarks (WI) T3	Negative Ranks	4[a]	5.00	20.00
	Positive Ranks	8[b]	7.25	58.00
	Ties	17[c]		
	Total	29		

a. EE critical remarks (WI) T4 < EE critical remarks (WI) T3

b. EE critical remarks (WI) T4 > EE critical remarks (WI) T3

c. EE critical remarks (WI) T3 = EE critical remarks (WI) T4

Test Statistics[b]

	EE critical remarks (WI) T4 - EE critical remarks (WI) T3
Z	-1.565[a]
Asymp. Sig. (2-tailed)	.118

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests: Subjects, M-C Unstructured Play +ve T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play +ve T2 - M-C unstruct play +ve T1	Negative Ranks	4[a]	6.25	25.00
	Positive Ranks	9[b]	7.33	66.00
	Ties	27[c]		
	Total	40		

a. M-C unstruct play +ve T2 < M-C unstruct play +ve T1

b. M-C unstruct play +ve T2 > M-C unstruct play +ve T1

c. M-C unstruct play +ve T1 = M-C unstruct play +ve T2

Test Statistics[b]

	M-C unstruct play +ve T2 - M-C unstruct play +ve T1
Z	-1.458[a]
Asymp. Sig. (2-tailed)	.145

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play +ve T3 - M-C unstruct play +ve T1	Negative Ranks	0[a]	.00	.00
	Positive Ranks	9[b]	5.00	45.00
	Ties	26[c]		
	Total	35		

a. M-C unstruct play +ve T3 < M-C unstruct play +ve T1

b. M-C unstruct play +ve T3 > M-C unstruct play +ve T1

c. M-C unstruct play +ve T1 = M-C unstruct play +ve T3

Test Statistics[b]

	M-C unstruct play +ve T3 - M-C unstruct play +ve T1
Z	-2.754[a]
Asymp. Sig. (2-tailed)	.006

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play +ve T4 - M-C unstruct play +ve T1	Negative Ranks	2[a]	6.25	12.50
	Positive Ranks	7[b]	4.64	32.50
	Ties	20[c]		
	Total	29		

a. M-C unstruct play +ve T4 < M-C unstruct play +ve T1

b. M-C unstruct play +ve T4 > M-C unstruct play +ve T1

c. M-C unstruct play +ve T1 = M-C unstruct play +ve T4

Test Statistics[b]

	M-C unstruct play +ve T4 - M-C unstruct play +ve T1
Z	-1.249[a]
Asymp. Sig. (2-tailed)	.212

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play +ve T3 - M-C unstruct play +ve T2	Negative Ranks	3[a]	4.33	13.00
	Positive Ranks	5[b]	4.60	23.00
	Ties	31[c]		
	Total	39		

a. M-C unstruct play +ve T3 < M-C unstruct play +ve T2

b. M-C unstruct play +ve T3 > M-C unstruct play +ve T2

c. M-C unstruct play +ve T2 = M-C unstruct play +ve T3

Test Statistics[b]

	M-C unstruct play +ve T3 - M-C unstruct play +ve T2
Z	-.722[a]
Asymp. Sig. (2-tailed)	.470

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play +ve T4 - M-C unstruct play +ve T3	Negative Ranks	4[a]	3.13	12.50
	Positive Ranks	1[b]	2.50	2.50
	Ties	25[c]		
	Total	30		

a. M-C unstruct play +ve T4 < M-C unstruct play +ve T3

b. M-C unstruct play +ve T4 > M-C unstruct play +ve T3

c. M-C unstruct play +ve T3 = M-C unstruct play +ve T4

Test Statistics[b]

	M-C unstruct play +ve T4 - M-C unstruct play +ve T3
Z	-1.414[a]
Asymp. Sig. (2-tailed)	.157

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests: Subjects, M-C Unstructured Play -ve T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play -ve T2 - M-C unstruct play -ve T1	Negative Ranks	8[a]	4.75	38.00
	Positive Ranks	2[b]	8.50	17.00
	Ties	30[c]		
	Total	40		

a. M-C unstruct play -ve T2 < M-C unstruct play -ve T1

b. M-C unstruct play -ve T2 > M-C unstruct play -ve T1

c. M-C unstruct play -ve T1 = M-C unstruct play -ve T2

Test Statistics[b]

	M-C unstruct play -ve T2 - M-C unstruct play -ve T1
Z	-1.085[a]
Asymp. Sig. (2-tailed)	.278

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play -ve T3 - M-C unstruct play -ve T1	Negative Ranks	7[a]	4.00	28.00
	Positive Ranks	0[b]	.00	.00
	Ties	28[c]		
	Total	35		

a. M-C unstruct play -ve T3 < M-C unstruct play -ve T1

b. M-C unstruct play -ve T3 > M-C unstruct play -ve T1

c. M-C unstruct play -ve T1 = M-C unstruct play -ve T3

Test Statistics[b]

	M-C unstruct play -ve T3 - M-C unstruct play -ve T1
Z	-2.401[a]
Asymp. Sig. (2-tailed)	.016

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play -ve T4 - M-C unstruct play -ve T1	Negative Ranks	4[a]	2.63	10.50
	Positive Ranks	1[b]	4.50	4.50
	Ties	24[c]		
	Total	29		

a. M-C unstruct play -ve T4 < M-C unstruct play -ve T1

b. M-C unstruct play -ve T4 > M-C unstruct play -ve T1

c. M-C unstruct play -ve T1 = M-C unstruct play -ve T4

Test Statistics[b]

	M-C unstruct play -ve T4 - M-C unstruct play -ve T1
Z	-.816[a]
Asymp. Sig. (2-tailed)	.414

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play -ve T3 - M-C unstruct play -ve T2	Negative Ranks	2[a]	3.75	7.50
	Positive Ranks	3[b]	2.50	7.50
	Ties	34[c]		
	Total	39		

a. M-C unstruct play -ve T3 < M-C unstruct play -ve T2

b. M-C unstruct play -ve T3 > M-C unstruct play -ve T2

c. M-C unstruct play -ve T2 = M-C unstruct play -ve T3

Test Statistics[b]

	M-C unstruct play -ve T3 - M-C unstruct play -ve T2
Z	.000[a]
Asymp. Sig. (2-tailed)	1.000

a. The sum of negative ranks equals the sum of positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play -ve T4 - M-C unstruct play -ve T3	Negative Ranks	0[a]	.00	.00
	Positive Ranks	1[b]	1.00	1.00
	Ties	29[c]		
	Total	30		

a. M-C unstruct play -ve T4 < M-C unstruct play -ve T3

b. M-C unstruct play -ve T4 > M-C unstruct play -ve T3

c. M-C unstruct play -ve T3 = M-C unstruct play -ve T4

Test Statistics[b]

	M-C unstruct play -ve T4 - M-C unstruct play -ve T3
Z	-1.000[a]
Asymp. Sig. (2-tailed)	.317

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests; Subjects, M-C Structured Play +ve T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play +ve T2 - M-C struct play +ve T1	Negative Ranks	4[a]	6.00	24.00
	Positive Ranks	11[b]	8.73	96.00
	Ties	25[c]		
	Total	40		

a. M-C struct play +ve T2 < M-C struct play +ve T1

b. M-C struct play +ve T2 > M-C struct play +ve T1

c. M-C struct play +ve T1 = M-C struct play +ve T2

Test Statistics[b]

	M-C struct play +ve T2 - M-C struct play +ve T1
Z	-2.144[a]
Asymp. Sig. (2-tailed)	.032

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play +ve T3 - M-C struct play +ve T1	Negative Ranks	2[a]	6.75	13.50
	Positive Ranks	10[b]	6.45	64.50
	Ties	22[c]		
	Total	34		

a. M-C struct play +ve T3 < M-C struct play +ve T1

b. M-C struct play +ve T3 > M-C struct play +ve T1

c. M-C struct play +ve T1 = M-C struct play +ve T3

Test Statistics[b]

	M-C struct play +ve T3 - M-C struct play +ve T1
Z	-2.053[a]
Asymp. Sig. (2-tailed)	.040

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play +ve T4 - M-C struct play +ve T1	Negative Ranks	3[a]	8.83	26.50
	Positive Ranks	9[b]	5.72	51.50
	Ties	17[c]		
	Total	29		

a. M-C struct play +ve T4 < M-C struct play +ve T1

b. M-C struct play +ve T4 > M-C struct play +ve T1

c. M-C struct play +ve T1 = M-C struct play +ve T4

Test Statistics[b]

	M-C struct play +ve T4 - M-C struct play +ve T1
Z	-1.016[a]
Asymp. Sig. (2-tailed)	.310

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play +ve T3 - M-C struct play +ve T2	Negative Ranks	2[a]	3.75	7.50
	Positive Ranks	3[b]	2.50	7.50
	Ties	33[c]		
	Total	38		

a. M-C struct play +ve T3 < M-C struct play +ve T2

b. M-C struct play +ve T3 > M-C struct play +ve T2

c. M-C struct play +ve T2 = M-C struct play +ve T3

Test Statistics[b]

	M-C struct play +ve T3 - M-C struct play +ve T2
Z	.000[a]
Asymp. Sig. (2-tailed)	1.000

a. The sum of negative ranks equals the sum of positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play +ve T4 - M-C struct play +ve T3	Negative Ranks	4[a]	2.50	10.00
	Positive Ranks	0[b]	.00	.00
	Ties	26[c]		
	Total	30		

a. M-C struct play +ve T4 < M-C struct play +ve T3

b. M-C struct play +ve T4 > M-C struct play +ve T3

c. M-C struct play +ve T3 = M-C struct play +ve T4

Test Statistics[b]

	M-C struct play +ve T4 - M-C struct play +ve T3
Z	-1.890[a]
Asymp. Sig. (2-tailed)	.059

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Tests: Sujects, M-C Structured Play -ve T1 to T4

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play -ve T2 - M-C struct play -ve T1	Negative Ranks	14[a]	8.14	114.00
	Positive Ranks	1[b]	6.00	6.00
	Ties	25[c]		
	Total	40		

a. M-C struct play -ve T2 < M-C struct play -ve T1

b. M-C struct play -ve T2 > M-C struct play -ve T1

c. M-C struct play -ve T1 = M-C struct play -ve T2

Test Statistics[b]

	M-C struct play -ve T2 - M-C struct play -ve T1
Z	-3.129[a]
Asymp. Sig. (2-tailed)	.002

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play -ve T3 - M-C struct play -ve T1	Negative Ranks	12[a]	8.17	98.00
	Positive Ranks	2[b]	3.50	7.00
	Ties	20[c]		
	Total	34		

a. M-C struct play -ve T3 < M-C struct play -ve T1

b. M-C struct play -ve T3 > M-C struct play -ve T1

c. M-C struct play -ve T1 = M-C struct play -ve T3

Test Statistics[b]

	M-C struct play -ve T3 - M-C struct play -ve T1
Z	-2.899[a]
Asymp. Sig. (2-tailed)	.004

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play -ve T4 - M-C struct play -ve T1	Negative Ranks	7[a]	4.86	34.00
	Positive Ranks	1[b]	2.00	2.00
	Ties	21[c]		
	Total	29		

a. M-C struct play -ve T4 < M-C struct play -ve T1

b. M-C struct play -ve T4 > M-C struct play -ve T1

c. M-C struct play -ve T1 = M-C struct play -ve T4

Test Statistics[b]

	M-C struct play -ve T4 - M-C struct play -ve T1
Z	-2.280[a]
Asymp. Sig. (2-tailed)	.023

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play -ve T3 - M-C struct play -ve T2	Negative Ranks	0[a]	.00	.00
	Positive Ranks	4[b]	2.50	10.00
	Ties	34[c]		
	Total	38		

a. M-C struct play -ve T3 < M-C struct play -ve T2

b. M-C struct play -ve T3 > M-C struct play -ve T2

c. M-C struct play -ve T2 = M-C struct play -ve T3

Test Statistics[b]

	M-C struct play -ve T3 - M-C struct play -ve T2
Z	-1.890[a]
Asymp. Sig. (2-tailed)	.059

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play -ve T4 - M-C struct play -ve T3	Negative Ranks	3[a]	3.00	9.00
	Positive Ranks	3[b]	4.00	12.00
	Ties	24[c]		
	Total	30		

a. M-C struct play -ve T4 < M-C struct play -ve T3

b. M-C struct play -ve T4 > M-C struct play -ve T3

c. M-C struct play -ve T3 = M-C struct play -ve T4

Test Statistics[b]

	M-C struct play -ve T4 - M-C struct play -ve T3
Z	-.333[a]
Asymp. Sig. (2-tailed)	.739

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, Emotional Problems T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
emotional problems T5 - emotional problems T1	Negative Ranks	7[a]	4.57	32.00
	Positive Ranks	3[b]	7.67	23.00
	Ties	3[c]		
	Total	13		

a. emotional problems T5 < emotional problems T1

b. emotional problems T5 > emotional problems T1

c. emotional problems T1 = emotional problems T5

Test Statistics[b]

	emotional problems T5 - emotional problems T1
Z	-.462[a]
Asymp. Sig. (2-tailed)	.644

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, Hyperactivity, T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
hyperactivity T5 - hyperactivity T1	Negative Ranks	2[a]	5.50	11.00
	Positive Ranks	7[b]	4.86	34.00
	Ties	4[c]		
	Total	13		

a. hyperactivity T5 < hyperactivity T1

b. hyperactivity T5 > hyperactivity T1

c. hyperactivity T1 = hyperactivity T5

Test Statistics[b]

	hyperactivity T5 - hyperactivity T1
Z	-1.362[a]
Asymp. Sig. (2-tailed)	.173

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, Conduct Problems T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
conduct problems T5 - conduct problems T1	Negative Ranks	4[a]	2.50	10.00
	Positive Ranks	7[b]	8.00	56.00
	Ties	2[c]		
	Total	13		

a. conduct problems T5 < conduct problems T1

b. conduct problems T5 > conduct problems T1

c. conduct problems T1 = conduct problems T5

Test Statistics[b]

	conduct problems T5 - conduct problems T1
Z	-2.046[a]
Asymp. Sig. (2-tailed)	.041

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, EE Warmth (SPQ) T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
EE warmth (spq) T5 - EE warmth (spq) T1	Negative Ranks	1[a]	2.00	2.00
	Positive Ranks	3[b]	2.67	8.00
	Ties	7[c]		
	Total	11		

a. EE warmth (spq) T5 < EE warmth (spq) T1

b. EE warmth (spq) T5 > EE warmth (soq) T1

c. EE warmth (spq) T1 = EE warmth (spq) T5

Test Statistics[b]

	EE warmth (spq) T5 - EE warmth (spq) T1
Z	-1.134[a]
Asymp. Sig. (2-tailed)	.257

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, EE Criticism (SPQ) T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
EE criticism (spq) T5 - EE criticism (spq) T1	Negative Ranks	0[a]	.00	.00
	Positive Ranks	1[b]	1.00	1.00
	Ties	10[c]		
	Total	11		

a. EE criticism (spq) T5 < EE criticism (spq) T1

b. EE criticism (spq) T5 > EE criticism (spq) T1

c. EE criticism (spq) T1 = EE criticism (spq) T5

Test Statistics[b]

	EE criticism (spq) T5 - EE criticism (spq) T1
Z	-1.000[a]
Asymp. Sig. (2-tailed)	.317

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, EE Positive Remarks T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
EE positive remarks (WI) T5 - EE positive remarks (WI) T1	Negative Ranks	2[a]	3.00	6.00
	Positive Ranks	3[b]	3.00	9.00
	Ties	6[c]		
	Total	11		

a. EE positive remarks (WI) T5 < EE positive remarks (WI) T1

b. EE positive remarks (WI) T5 > EE positive remarks (WI) T1

c. EE positive remarks (WI) T1 = EE positive remarks (WI) T5

Test Statistics[b]

	EE positive remarks (WI) T5 - EE positive remarks (WI) T1
Z	-.447[a]
Asymp. Sig. (2-tailed)	.655

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, Critical Remarks T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
EE critical remarks (WI) T5 - EE critical remarks (WI) T1	Negative Ranks	0[a]	.00	.00
	Positive Ranks	2[b]	1.50	3.00
	Ties	9[c]		
	Total	11		

a. EE critical remarks (WI) T5 < EE critical remarks (WI) T1

b. EE critical remarks (WI) T5 > EE critical remarks (WI) T1

c. EE critical remarks (WI) T1 = EE critical remarks (WI) T5

Test Statistics[b]

	EE critical remarks (WI) T5 - EE critical remarks (WI) T1
Z	-1.414[a]
Asymp. Sig. (2-tailed)	.157

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, M-C Unstructured Play +ve T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play +ve T5 - M-C unstruct play +ve T1	Negative Ranks	3[a]	4.00	12.00
	Positive Ranks	4[b]	4.00	16.00
	Ties	1[c]		
	Total	8		

a. M-C unstruct play +ve T5 < M-C unstruct play +ve T1

b. M-C unstruct play +ve T5 > M-C unstruct play +ve T1

c. M-C unstruct play +ve T1 = M-C unstruct play +ve T5

Test Statistics[b]

	M-C unstruct play +ve T5 - M-C unstruct play +ve T1
Z	-.378[a]
Asymp. Sig. (2-tailed)	.705

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, M-C Unstructured Play -ve T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
M-C unstruct play -ve T5 - M-C unstruct play -ve T1	Negative Ranks	4[a]	2.50	10.00
	Positive Ranks	0[b]	.00	.00
	Ties	4[c]		
	Total	8		

a. M-C unstruct play -ve T5 < M-C unstruct play -ve T1

b. M-C unstruct play -ve T5 > M-C unstruct play -ve T1

c. M-C unstruct play -ve T1 = M-C unstruct play -ve T5

Test Statistics[b]

	M-C unstruct play -ve T5 - M-C unstruct play -ve T1
Z	-2.000[a]
Asymp. Sig. (2-tailed)	.046

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, M-C Structured Play +ve T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play +ve T5 - M-C struct play +ve T1	Negative Ranks	1[a]	1.50	1.50
	Positive Ranks	1[b]	1.50	1.50
	Ties	6[c]		
	Total	8		

a. M-C struct play +ve T5 < M-C struct play +ve T1

b. M-C struct play +ve T5 > M-C struct play +ve T1

c. M-C struct play +ve T1 = M-C struct play +ve T5

Test Statistics[b]

	M-C struct play +ve T5 - M-C struct play +ve T1
Z	.000[a]
Asymp. Sig. (2-tailed)	1.000

a. The sum of negative ranks equals the sum of positive ranks.

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test: Controls, M-C Structured Play -ve T1 to T5

Ranks

		N	Mean Rank	Sum of Ranks
M-C struct play -ve T5 - M-C struct play -ve T1	Negative Ranks	1[a]	3.00	3.00
	Positive Ranks	3[b]	2.33	7.00
	Ties	4[c]		
	Total	8		

a. M-C struct play -ve T5 < M-C struct play -ve T1

b. M-C struct play -ve T5 > M-C struct play -ve T1

c. M-C struct play -ve T1 = M-C struct play -ve T5

Test Statistics[b]

	M-C struct play -ve T5 - M-C struct play -ve T1
Z	-.756[a]
Asymp. Sig. (2-tailed)	.450

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test.

Mann-Whitney Test: Subjects vs Controls Main Outcome Measures T1

Ranks

	case	N	Mean Rank	Sum of Ranks
emotional problems T1	subject	47	29.27	1375.50
	control	13	34.96	454.50
	Total	60		

Test Statistics[a]

	emotional problems T1
Mann-Whitney U	247.500
Wilcoxon W	1375.500
Z	-1.049
Asymp. Sig. (2-tailed)	.294

a. Grouping Variable: case

Ranks

	case	N	Mean Rank	Sum of Ranks
hyperactivity T1	subject	47	31.69	1489.50
	control	13	26.19	340.50
	Total	60		

Test Statistics[a]

	hyperactivity T1
Mann-Whitney U	249.500
Wilcoxon W	340.500
Z	-1.005
Asymp. Sig. (2-tailed)	.315

a. Grouping Variable: case

Ranks

	case	N	Mean Rank	Sum of Ranks
conduct problems T1	subject	47	30.65	1440.50
	control	13	29.96	389.50
	Total	60		

Test Statistics[a]

	conduct problems T1
Mann-Whitney U	298.500
Wilcoxon W	389.500
Z	-.126
Asymp. Sig. (2-tailed)	.900

a. Grouping Variable: case

Ranks

	case	N	Mean Rank	Sum of Ranks
EE warmth T1	subject	41	27.37	1122.00
	control	11	23.27	256.00
	Total	52		

Test Statistics[a]

	EE warmth T1
Mann-Whitney U	190.000
Wilcoxon W	256.000
Z	-1.007
Asymp. Sig. (2-tailed)	.314

a. Grouping Variable: case

Ranks

	case	N	Mean Rank	Sum of Ranks
EE criticism T1	subject	41	25.48	1044.50
	control	11	30.32	333.50
	Total	52		

Test Statistics[a]

	EE criticism T1
Mann-Whitney U	183.500
Wilcoxon W	1044.500
Z	-1.279
Asymp. Sig. (2-tailed)	.201

a. Grouping Variable: case

Ranks

	case	N	Mean Rank	Sum of Ranks
EE positive remarks T1	subject	41	27.22	1116.00
	control	11	23.82	262.00
	Total	52		

Test Statistics[a]

	EE positive remarks T1
Mann-Whitney U	196.000
Wilcoxon W	262.000
Z	-.785
Asymp. Sig. (2-tailed)	.433

a. Grouping Variable: case

Ranks

	case	N	Mean Rank	Sum of Ranks
EE critical remarks T1	subject	41	25.60	1049.50
	control	11	29.86	328.50
	Total	52		

Test Statistics[a]

	EE critical remarks T1
Mann-Whitney U	188.500
Wilcoxon W	1049.500
Z	-.949
Asymp. Sig. (2-tailed)	.343

a. Grouping Variable: case

Ranks

	case	N	Mean Rank	Sum of Ranks
M-C unstruct play +ve T1	subject	42	28.88	1213.00
	control	10	16.50	165.00
	Total	52		

Test Statistics[a]

	M-C unstruct play +ve T1
Mann-Whitney U	110.000
Wilcoxon W	165.000
Z	-2.669
Asymp. Sig. (2-tailed)	.008

a. Grouping Variable: case

Ranks

	case	N	Mean Rank	Sum of Ranks
M-C unstruct play -ve T1	subject	42	22.77	956.50
	control	10	42.15	421.50
	Total	52		

Test Statistics[a]

	M-C unstruct play -ve T1
Mann-Whitney U	53.500
Wilcoxon W	956.500
Z	-4.295
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: case

Ranks

	case	N	Mean Rank	Sum of Ranks
M-C struct play +ve T1	subject	42	27.74	1165.00
	control	10	21.30	213.00
	Total	52		

Test Statistics[a]

	M-C struct play +ve T1
Mann-Whitney U	158.000
Wilcoxon W	213.000
Z	-1.429
Asymp. Sig. (2-tailed)	.153

a. Grouping Variable: case

Ranks

	case	N	Mean Rank	Sum of Ranks
M-C struct play -ve T1	subject	42	23.71	996.00
	control	10	38.20	382.00
	Total	52		

Test Statistics[a]

	M-C struct play -ve T1
Mann-Whitney U	93.000
Wilcoxon W	996.000
Z	-3.021
Asymp. Sig. (2-tailed)	.003

a. Grouping Variable: case

APPENDIX 2: INFORMATION AND CONSENT SHEETS

DEPARTMENT OF CHILD AND FAMILY PSYCHIATRY
ROYAL HOSPITAL FOR SICK CHILDREN
YORKHILL, GLASGOW

PRE-SCHOOL OVERACTIVITY PROGRAMME.

The child psychiatrist whom you have seen has suggested that you and your child might benefit from taking part in the Pre-school Overactivity Programme. This information sheet will tell you about the project and we will discuss it in more detail with you and answer any of your questions.

WHAT IS THE PRE-SCHOOL OVERACTIVITY PROGRAMME?

The Pre-school Overactivity Programme is a new treatment programme aimed at helping children who have problems with overactive behaviour and their families.

WHY WAS IT SET UP?

Many children and families seen at the Department of Child and Family Psychiatry have much the same sort of problems as you, in terms of their children's overactive behaviour. We use the same treatment methods with these children and their families. We think that instead of seeing families individually, it might be better to run groups. In this way we still use the same treatment methods but there are added advantages, such as parents getting the chance to meet other parents who are having the same problems, to share experiences with one another and to support one another. In addition, the children will benefit from being in a situation where they can be helped to learn to control their behaviour and get on better with other children.

WHAT DOES THE PROGRAMME CONSIST OF?

The programme will run for 10 weeks, during which time you and your child will attend the Department of Child and Family Psychiatry once a week, on Wednesdays, from 10 a.m. to 2 p.m. 10 weeks may seem like a long time, but we feel that it is worth putting in this amount of effort as it may prevent problems in the long run.

The programme involves taking part in groups. There will be a group for the parents and a separate group for the children. There will be about 8 parents and children in each programme.

THE PARENTS' GROUP

In the parents' group, you will be able to share your experiences and difficulties with other parents who have similar problems. In addition there will be two therapists in the group who will teach you ways in which to help your child overcome his/her difficult behaviour. The aim is that the problem behaviour gets less so that you and you child can have more fun together.

THE CHILDREN'S GROUP

In the children's group trained therapists will be working with the children, teaching them ways of learning how to control their behaviour and how to get on better with other children.

The groups will take place in separate rooms in the Department but you will not be far from your child and you will be able to see them at any time you wish. Also we will all have lunch together (sandwiches, juice, tea and coffee will be provided).

Before you start in the programme, you and your child will be asked to come to the hospital for an assessment interview. This will take either a morning or an afternoon and will take place at the Department of Child and Family Psychiatry. You will be asked to fill out a questionnaire about your child's behaviour and we will then ask you some more detailed questions about your child's problems, your family and yourself. We will ask your child to take part in two simple games with us which are designed to check out certain aspects of behaviour. You will be able to observe this part of the assessment. In addition we would like to video you and your child playing together so that we can then use this to discuss with you, different ways of changing his/her behaviour. A clinical psychologist will see your child to test how he/she manages some tasks appropriate to his/her age. We will also carry out a medical examination of your child but this would not routinely involve your child having blood samples or x-rays etc.

At the end of the programme we will ask you to fill out another questionnaire and we would ask you and your child some more questions. So that we can see how things work out for you and your child we would like to see you again 6 months and a year after you finish the programme.

All the information you give us in the questionnaires and during the interview will be confidential. If we find that your child's problems are not helped by the programme then further help will be available in the Department.

We are looking forward to you and your child joining us in the Pre-school Overactivity Programme.

Dr Joanne Barton
Lecturer/Honorary Senior Registrar
Child and Adolescent Psychiatry

Mrs Angela Bower
Clinical Nurse Specialist

DEPARTMENT OF CHILD AND FAMILY PSYCHIATRY

ROYAL HOSPITAL FOR SICK CHILDREN
YORKHILL, GLASGOW

PRE-SCHOOL OVERACTIVITY PROGRAMME

I _____ of _____ agree to myself and my child _____ taking part in the Pre-school Overactivity Programme. I have read the information sheet and understand the purpose of the programme. I agree that the interviews can be recorded for clinical and training purposes, which includes showing to professional colleagues for discussion. I understand that I may withdraw from the programme at any time and that this would not affect any further treatment that I or my child may require.

Signed _____

Witnessed _____

Date _____

APPENDIX 3: USER SATISFACTION QUESTIONNAIRE

PRE-SCHOOL OVERACTIVITY PROGRAMME

PARENTS QUESTIONNAIRE

Now that you and your child have completed the programme it would help us if you and your partner could complete this questionnaire so that we can use the information you give us to improve the programme.
It is important that you answer as honestly and fully as you can, we're not looking for a pat on the back and we won't be offended by criticism, often, constructive criticism is the most helpful and useful information you can give us.

You don't need to identify yourself on this form, we will only record which group you attended. It is also important for you to know that this information will be treated as confidential information, in the same way as any other hospital records.

PLEASE CIRCLE OR TICK YOUR CHOSEN ANSWER.

1. Before the programme started would you have liked more information?

YES	NO

If you have answered yes, could you say what specific information you would have liked.

.....
.....
.....

2. Do you think the facilities in general were adequate ?

STRONGLY AGREE	AGREE	UNSURE	DISAGREE	STRONGLY DISAGREE

If you have specific ideas/comments about the following we would like to know what you think:

Rooms

.....

.....

Food/Drinks

.....

.....

Waiting Area

.....

.....

Toilet facilities

.....

.....

3. Evening Sessions - were they useful ?

STRONGLY AGREE	AGREE	UNSURE	DISAGREE	STRONGLY DISAGREE

Can you suggest ways they could be improved ?

.....

.....

.....

.....

4. Fathers Evening - were they useful ?

STRONGLY AGREE	AGREE	UNSURE	DISAGREE	STRONGLY DISAGREE

Can you suggest ways they could be improved ?

.....

.....

.....

.....

5. Did you find the therapists helpful?

VERY HELPFUL	HELPFUL	NEUTRAL	UNHELPFUL	VERY UNHELPFUL

Do you have any further comments to make about the therapists ?

.....
.....
.....
.....

6. Did you find the handbook helpful ?

VERY HELPFUL	HELPFUL	NEUTRAL	UNHELPFUL	VERY UNHELPFUL

Is there anything you would change about the handbook or are there things missing that you would like to see included?

.....
.....
.....
.....

7. Did you find the video material helpful?

VERY HELPFUL	HELPFUL	NEUTRAL	UNHELPFUL	VERY UNHELPFUL

Do you have any suggestions to help us improve this?

.....
.....
.....
.....

8. Did you find the "bug in the ear" teaching helpful ?

VERY HELPFUL	HELPFUL	NEUTRAL	UNHELPFUL	VERY UNHELPFUL

Do you have any suggestions to help us improve this?

.....
.....
.....
.....

9. Did you find the mother's group helpful ?

VERY HELPFUL	HELPFUL	NEUTRAL	UNHELPFUL	VERY UNHELPFUL

Do you have specific comments about the mothers' group? Please answer with as much detail as you can.

.....
.....
.....
.....
.....
.....
.....

8. Do you think the children's group was helpful to your child?

VERY HELPFUL	HELPFUL	NEUTRAL	UNHELPFUL	VERY UNHELPFUL

.....
.....
.....
.....
.....

9. Do you think the children's group was helpful to you?

VERY HELPFUL	HELPFUL	NEUTRAL	UNHELPFUL	VERY UNHELPFUL

Do you have specific comments about the children's group? Please answer with as much detail as you can.

.....
.....
.....
.....
.....

9. Is there anything else you would like to add that we haven't asked about? Please use the rest of the paper for other comments

We are very grateful for the time and effort you have spent on this form and we will put the information to good use.
Please return it in the stamped addressed envelope enclosed.

Dr Joanne Barton

Janette Drummond